



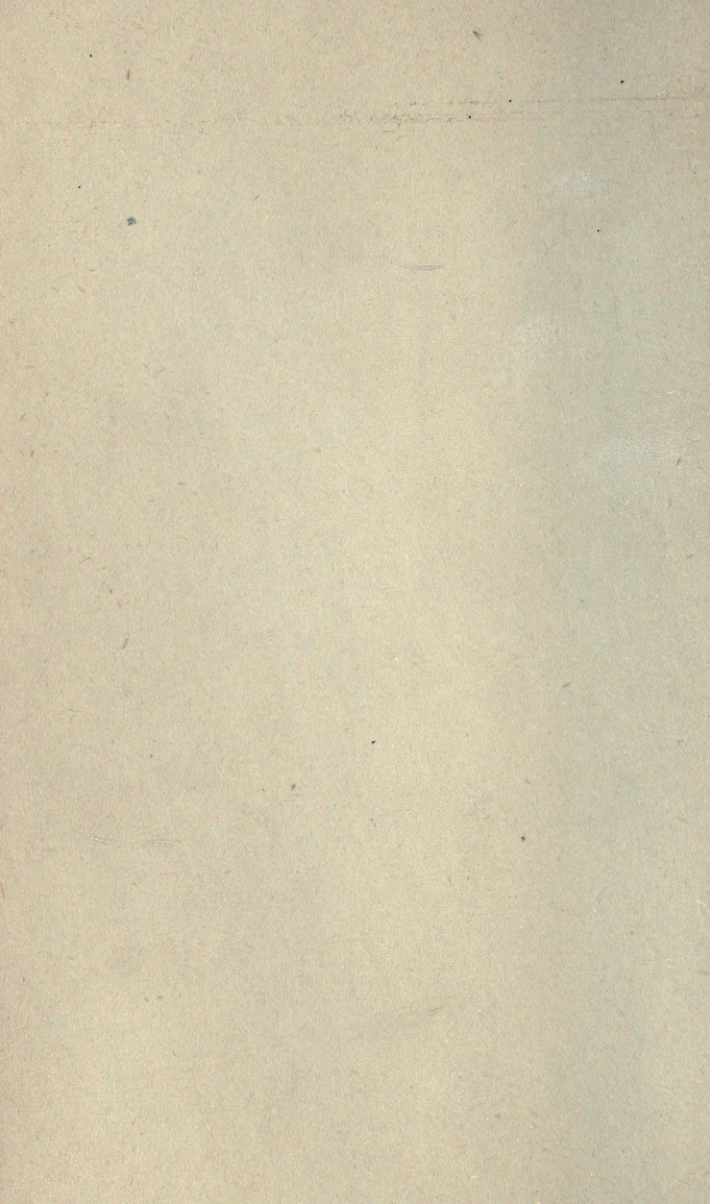
3 1761 07550673 3





Presented to the
LIBRARY *of the*
UNIVERSITY OF TORONTO
by
Sask Tel
Corporate Library





ELECTRICAL WORKERS STANDARD LIBRARY

COMPLETE

*Practical Authoritative Comprehensive
Up-to-Date Working Manuals for
Electrical Workers*

ILLUSTRATED

EDITORS IN CHIEF

Henry C. Horstmann

Victor H. Tousley

ELECTRICAL EXPERTS

DEPARTMENT OF ELECTRICITY
CITY OF CHICAGO

ASSISTED BY THE INSTRUCTORS ELECTRICAL DEPARTMENT

NATIONAL INSTITUTE OF
PRACTICAL MECHANICS

BROTHERHOOD
EDITION



PUBLISHERS

NATIONAL INSTITUTE of PRACTICAL
Chicago MECHANICS *U.S.A.*



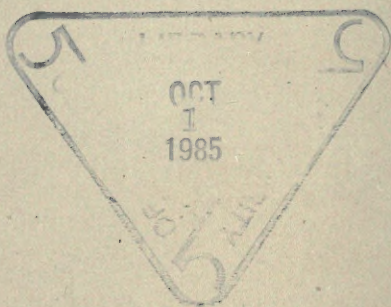
TK

7

E44

1912

v. 7



ELECTRICAL WORKERS' STANDARD LIBRARY

A Complete Series of Practical Text Books Prepared
Especially for the Use of Electricians, Engineers,
Mechanics, Students, Telegraph and Telephone
Operators and Anyone Interested in Electricity.

BY

PAUL E. LOWE, M. E.

Assisted by a Corps of Experts, Electrical Engineers, and Designers
Connected with the National Institute of Practical Mechanics.

VOLUME VII.

A Thoroughly Practical Up-to-Date Electrical Dictionary,
An Authoritative Guidance to Any and All Electrical
Terms, Containing All the Scientific Principles Which
Constitute the Foundation of Electrical Engineering. An
Authentic, Reliable Book of Reference, Completely Revised
and Strictly Up-to-Date.

PUBLISHERS

NATIONAL INSTITUTE OF PRACTICAL MECHANICS
CHICAGO, U. S. A.

COPYRIGHT 1912
BY THE
NATIONAL INSTITUTE OF PRACTICAL MECHANICS
CHICAGO, ILLINOIS

AUTHORITIES CONSULTED

SYLVANUS P. THOMPSON,

Author of Elementary Lessons in Electricity and Magnetism.

C. WALTON SWOOPE,

Author of Lessons in Practical Electricity.

HENRY S. CARHART, LL.D.,

and

HORATIO N. CHUTE, M.S.,

Authors of Physics for High School Students.

ROBERT ANDREWS MILLIKAN, Ph.D.,

and

HENRY GORDON GALE, Ph.D.,

Authors of A First Course in Physics.

FRANKLIN LEONARD POPE,

Author of Modern Practice of the Electric Telegraph.

FRANCIS B. CROCKER, E.M., Ph.D.,

Author of Electric Lighting.

AUTHORITIES CONSULTED

CLARK CARYL HASKINS,
Author of Electricity Made Simple.

HENRY C. HORSTMAN
and
VICTOR H. TOUSLEY,
Authors of Modern Wiring Diagrams and Descriptions.

L. P. DICKINSON,
Author of Easy Electrical Experiments.

FREDERICK BEDELL
and
A. C. CREHORE,
Authors of Alternating Currents.

LOUIS BELL,
Author of The Art of Illumination.

H. C. CUSHING,
Author of Standard Wiring for Electric Light and
Power.

CARL HERING,
Author of Ready Reference Tables.

AUTHORITIES CONSULTED

R. W. HUTCHINSON, JR.,
Author of Long Distance Electric Power.

H. F. PARSHALL
and
H. M. HOBART,
Authors of Electric Railway Engineering.

E. PARRY,
Author of Electrical Equipment of Tramways.

F. A. C. PERRINE, A. M. D. Sc.,
Author of Conductors for Electrical Distribution.

WM. JOHN MAC QUORN RANKINE,
Late Professor of Engineering, Glasgow University.
Author of Manual of Applied Mechanics.

DR. R. H. THURSTON,
Author of Manual of the Steam Engine.

KENELM EDGCUMB,
Author of Electrical Engineers' Hand Book.

HENRY M. HOBART,
Author of Electric Motors, Their Theory and
Construction.

AUTHORITIES CONSULTED

PROF. WM. KENT,
Author of Mechanical Engineers' Reference Book.

DR. PEABODY,
Author of Manual of Steam Boilers.

PROF. WALTER S. HUTTON,
Author of Practical Engineers' Hand Book.

PROF. JAMEISON,
Author of Applied Mechanics—Mechanics of Engineering.

HENRY ADAMS,
Professor of Engineering, London College.
Author of Handbook for Mechanical Engineers.

WILFRID J. LINEHAM,
M. Inst., M. E., M. Inst., E. E.,
Author of Text Book of Mechanical Engineering.

DR. A. STODOLA
and
DR. LOUIS C. LOEWENSTEIN,
Authors of Steam Turbines, Gas Turbines, Heat Engines.

GEO. H. BABCOCK,
Ex-President American Society of Mechanical Engineers.

AUTHORITIES CONSULTED

W. GEIPEL, M. Inst., E. E.,
M. HAMILTON KILGOUR, A. M. I. C. E., M. I. E. E.,
Authors of Pocket Book of Electrical Formulæ.

T. O'CONNOR SLOANE, A. M., E. M., Ph. D.,
Author of Arithmetic of Electricity, Standard Electrical
Dictionary, Electricians' Handy Book.

WM. M. BARR,
Member American Society of Mechanical Engineers.
Author of Boilers and Furnaces—Chimneys of Brick
and Metal.

C. E. KNOX, E. E.,
Member American Institute of Electrical Engineers.
Author of Electric Light Wiring.

H. A. FOSTER,
Author of Electrical Engineers' Pocket Book.

S. A. FLETCHER,
Chief Westinghouse Companies' Publishing Department.

F. H. GALE
and
MARTIN P. RICE,
General Electric Companies' Publication Bureau.

Authorities Consulted

FRANCIS BACON CROCKER, M. E., Ph. D.
Professor of Electrical Engineering, Columbia College, New York.

SCHUYLER S. WHEELER, D. Sc.
Electrical Expert of the Board of Electrical Control, New York City.

EDWIN JAMES HOUSTON, Ph. D.
Professor of Physics, Franklin Institute, Pennsylvania.

ARTHUR E. KENNELLY, D. Sc.
Author of Algebra Made Easy, Alternating Currents, Arc Lighting, Electric Heating, Etc.

DUGALD C. JACKSON, C. E.
and
JOHN PRICE JACKSON, M. E.
Joint Authors of Text-Book on Electro-Magnetism and the Construction of Dynamos, and Alternating Currents and Alternating Current Machinery.

CALVIN F. SWINGLE, M. E.
Author of 20th Century Hand Book for Steam Engineers and Electricians, etc., etc.

AUTHORITIES CONSULTED

WILLIAM ESTY, S. B., M. A.

Head of Dept. of Electrical Engineering, Lehigh
University.

DUGALD C. JACKSON, C. E.

Head of Dept. of Electrical Engineering, University
of Wisconsin.

GEORGE C SHAAD, B. S.

Assistant Professor of Electrical Engineering,
University of Wisconsin.

CHARLES THOM.

Chief Quadruplex Department, Western Union
Telegraph Company.

KEMPSTER B. MILLER, M. E.

Consulting Engineer and Telephone Expert,
Author of "American Telephone Practice."

LOUIS DERR, S. B., A. M.

Associate Professor of Physics, Massachusetts
Institute of Technology.

H. R. VAN DEVENTER, C. S. E. E.

Author of "Telephonology."

PREFACE

The National Institute of Practical Mechanics, realizing that the battle grounds of to-day are industrial and that we combat in the name of Commerce, also know that the same valour and quality of daring is required to command the forces of business. The weapon of this hour is no longer nobility, but the mightiest is utility—the worker is now peerless—and of all the castes, labor is the highest.

In order to meet the test, the great need is to assist skilled labor to a more scientific knowledge of its work. The Electrical Workers' Standard Library has been prepared under our direction, with this idea in mind of presenting in a clear cut, easily understood manner, the latest methods and all essential principles a working electrician ought to know. A library that one can understand—a work complying in all respects with the safety rules of the National Board of Fire Underwriters.

Electricity is still in its infancy, yet the last twenty-five years has wrought such wonderful changes that those who are now a success in this chosen field know that there is still further and greater rewards sure to come to those who meet

the test she offers—in furtherance and perfection of the many secrets she is yet to divulge.

The National Institute of Practical Mechanics, following out her plan of instruction which has proven so successful in the past in teaching scientific principles, has combined its many years of experience in teaching with the practical experience of trained electricians and engineers and presents an acknowledged authority, that is no longer an experiment.

It presents to the beginner or electrician a complete and compact treatise on Electrical Construction Work, a reliable guide for installing work in the most improved method—and especially in accordance with the Safety Rules—making the artisan's finished product absolutely standard and correct.

We have aimed throughout the volumes to cover all elementary principles in detail and give necessary tables—and especially to furnish all formulæ in simple and non-technical form.

Many test questions are furnished for practice—as a helper to the student in fixing the essentials and rudiments in his mind, thereby combining in the one set, a textbook, a ready reference, a quizzer, that lead to that great asset, a permanent and lasting knowledge of the subject.

We gratefully acknowledge our indebtedness to the corps of electrical experts who have assisted us so kindly, and to their generous aid and their hearty support in our behalf this work is due.

The work has been tried with the spirit level and plumb line, the straight line is now the shortest distance to the given point.

Go back to School. Select the text. Don't turn to page 2 until you know page 1. You'll accomplish volumes, the weary hours of searching scattered text books will be abandoned and that your need is presented is the hope of the compilers.

ELECTRICAL DICTIONARY.

A

A. C.—An abbreviation expressing an alternating current.

Absolute.—Complete by itself. Independent of any other element.

Absolute Unit of Current.—A current possessing a degree of strength, and which when transmitted through a wire which has been curved in the shape of an arc of a circle of one centimetre radius, will act on a one-unit power magnetic pole, stationed at the center of the arc, with a force equal to one degree. A 10 amperes current.

Absolute Unit of Electromotive Force.—The electromotive force unit C. G. S.

Absolute Vacuum.—A void produced by the exhaustion of all residual gases.

Absorption.—The act of one form of material substance sucking or drawing in some other form of matter. The sucking in of water by a sponge or the drawing in of vapors, gases, light, electricity, energy or heat by any other material substance.

Absorption Power.—A property peculiar to certain materials by which they draw in gases through their pores and condense them.

Acceleration.—The increase or decrease of motion or action. The time period of mutation in velocity.

Accumulated Electricity.—Electricity confined or stored as in a condenser.

Accumulating Electricity.—Confining or placing electricity in storage.

Accumulation of Electricity.—The gathering of electric charges in condensers or Leyden jars. An electric charge augmented by aid of a device term an accumulator. A charge produced by the use of an influence machine. The gathering of electricity by storage batteries or accumulators.

Accumulator.—A term sometimes used to designate a current accumulator. A condenser, a Leyden jar, a storage battery.

Acetometer or Acidometer.—A graduated hydrometer used to ascertain the strength of acetic acid or vinegar.

Achromatic Lens.—A lens producing images without false coloring.

Acidometer.—(See Acetometer.)

Acoustic.—Pertaining to the sense of hearing, or sound.

Acoustic Absorption.—The absorbing by one vibrating object or mass of the sound-wave energy created by another vibrating object or mass.

Acoustic Interference.—Mutual influence of sound-waves upon each other.

Acoustic Synchronizer.—A contrivance employed to mark the synchronism of two alternating currents. An acoustic apparatus in which at synchronism silence is effected.

Actinic.—Pertaining to chemical changes produced by

the sun's rays, or radiators from other sources of energy.

Actinic Photometer.—A photometer which determines the intensity of light by the quantity of decomposition which is chemically obtained in it.

Actinic Ray.—Any form of radiating energy having the property to induce chemical action.

Actinometer.—An apparatus for determining the degree of energy in the chemical effects of light.

Active Coil or Conductor.—A coil or conductor conveying a current of electricity.

Active Current.—The active constituent of a current in an alternating current circuit, in contradistinction from the wattless component of current.

Active Electromotive Force.—That constituent of the impressed electromotive force in an alternating current which is employed to surmount the ohmic resistance, in contradistinction from the component employed to overcome the induced C. E. M. F.

Active Material Storage Cell.—The matter which decomposes while charging or discharging in a storage or secondary cell and which performs the function of storing electricity.

Active Plate of Voltaic Cell.—A term applied to the zinc and other metallic plates used in voltaic or primary cells, and which dissolve in the process of active operation.

Active Polar Surface of Magnet.—The surface of a magnet which emits or absorbs the useful flux.

Active Wire.—The section of wire on the armature of a dynamo which goes through the inducing mag-

netic flux, in contradistinction from the "idle wire," or the remaining wire which does not pass through the flux.

Activity.—Power. Rate of performance. Performance per second in invariable operation.

Actual Efficiency.—Efficiency answering commercial purposes.

Acute Angle.—An angle less than 90 degrees, or less than a right angle.

Adapter.—A threaded projection attached to an incandescent electric lamp by means of which the lamp can be screwed to gas fixtures in the place of gas burner. A device enabling a lamp of any one manufacture to be fitted into the socket of the lamp of every other manufacture. An apparatus contrived to modify the continuous electric current used in incandescent service, in order that the mild continuous currents employed in electro-therapeutics may be obtained.

Adhesion.—An attraction existing between heterogeneous molecules in contradistinction from cohesion or the mutual attraction of homogeneous molecules.

Adhesion, Electric.—The adhesion of two surfaces resulting from the attraction of dissimilar electrostatic charges.

Adhesion, Magnetic.—The adhesion of surfaces resulting from magnetic flux.

Adhesive Tape.—A tape rendered adhesive by the application of an adhesive insulating material, and used to protect bare conductors at joints and other exposed points.

Adiabatic Expansion.—The expansion of a gas in a chamber whose walls receive no heat from the gas nor convey any to it differing thus from isothermal expansion.

Adjustable Condenser.—A condenser, the capacity of which is susceptible of variation within prescribed limits.

Adjustable Resistance.—A resistance, the degree of which is easily varied within prescribed limits.

Adjustable Rheostat.—A resistance readily adjusted.

Adjustable Vacuum Tube.—A vacuum tube designed for X-ray examinations; the vacuum in which is diminishable by heat acting upon a vaporizable substance.

Adjuster for Lamp Pendant.—A device of any description suitable for making adjustments or changes in altitude or position of pendant lamps.

Adjusting Cleat.—A cleat susceptible to adjustment with reference to altitude or alignment.

Adjustment.—Any change in an apparatus which will insure correct performance of its office.

Adjustment of Relay.—That regulation of a receiving relay which insures ready response to signals forwarded over the line.

Aerial Circuit.—The section of a circuit composed of aerial lines or conductors. An elevated circuit of wire.

Aerial Conductor.—A conductor erected overhead.

Aerial Line.—A line erected overhead.

Aerodynamics.—The science which treats of the motion of air and its mechanical effect when in motion.

Aero-Ferric Inductance.—The inductance inherent in a coil, the magnetic circuit of which is composed in parts of air and iron.

After Glow.—A fluorescent glow visible in an exhausted container of glass after removal from electrostatic influence.

Age-Coating of Electric Incandescent Lamp Chamber.—A black coating from carbon and other like substances deposited in the chamber of an incandescent lamp while in active service.

Aging of Alcohol, Electric.—The artificial aging of alcohol by subjecting it to the action of ozone generated by electricity.

Aging of Electric Incandescent Lamp.—A diminishing by degrees of the capacity of an electric incandescent lamp resulting from either age-coating or impairment of the filament.

Aging of Transformer.—A diminution in the capacity of a transformer due to its core becoming old. Transformer fatigue.

Agone.—A line on the earth's surface on which the magnetic needle points to the true north, the magnetic meridian coinciding with the geographical.

Air Blast for Commutator.—A blast of air played upon the surface of the commutator of an electric dynamo to obviate damaging flashes.

Air Blast Transformer.—A transformer which is kept cool by the application of an air jet.

Air Churning.—The motion of the air contiguous to the armature of a dynamo or motor while rotating, occasioning a loss of energy.

Air Core Solenoid.—A solenoid whose sole core is air.

Air Gap.—Any gap or aperture in a magnetic circuit which contains air only.

Air Gap Commutator.—The air space between the parts of contact in an air-insulated commutator.

Air Insulation.—Insulation procured by the action of air.

Air Pump.—A contrivance employed to withdraw the air and other gases from a vessel.

Air Resistance of Dynamo.—The mechanical resistance opposed by the surrounding air to the rotary motion of a dynamo.

Air Space.—The space existing between the polar surface within which an armature rotates, and the surface of the armature itself. The space in a comb lightning arrester between the opposing surfaces.

Alarm Electric.—Any electric contrivance which, working automatically, directs attention, by the opening and closing of a circuit, to certain occurrences, i. e.: the movement of doors or windows, the reaching of certain prescribed limits in the rise and fall of temperature, footsteps in certain places, etc. A device used to summon a person to a telephone or a telegraphic instrument.

“Alive.”—A term applied to live circuits or wires. Active circuits or wires.

All-Night Arc Lamp.—An arc lamp with a double carbon.

Allotropic State.—The property of substances of existing in two or more conditions which are distinct in their physical relation, but without change in

their chemical composition, i. e.: the various modifications of carbon.

Alloy.—Any compound of two or more metals, as of copper and zinc to form brass.

Alternate Currents.—Currents which alternate.

Alternating.—Having a periodical change in direction.

Alternating Arc.—An arc with alternating current. An arc which receives its supply from an alternating current circuit.

Alternating Continuous-Current Commutating Machine.

A secondary generator, which by aid of a commutator, is employed to change an alternating to a continuous current.

Alternating-Current Dynamo-Electric Machine.—A dynamo-electric machine which produces in its external circuit currents that alternate.

Alternating-Current Electric Motor.—A motor impelled by currents that alternate.

Alternating-Current Electro-Magnet.—An electro-magnet, the coils of which are traversed by alternating currents, and whilst continually reversing in magnetism, yet maintains a constant attraction for the armature.

Alternating-Current Phase-Meter.—An apparatus employed to determine the phase difference between two alternating currents.

Alternating-Current Power.—Electric power furnished with alternating currents. The result of the efficient alternating current force, the energy of pressure under which the current is obtained, and the power factor.

Alternating-Current Pressure Indicator.—An alternating current volt-meter.

Alternating-Current Regulator.—A contrivance employed to regulate the pressure of an alternating current generator, with a view to maintaining constancy. A regulator employed to govern the strength of an alternating current.

Alternating-Current Transmission.—Transmission of power by the use of alternating currents.

Alternating Currents.—Currents flowing in opposite directions and alternating. Currents which reverse their direction periodically.

Alternation.—A change of direction. A change of direction by an electro-motive current. One vibration instead of an entire cycle or a double vibration.

Amalgam.—A compound of mercury or quick silver with any other metal.

Amalgam, Electric.—A substance used to cover the rubbers of frictional electric machines.

Amalgamate.—To convert into an amalgam.

Amalgamation of Zinc.—A salt of mercury solution used in amalgamating the zincs of voltaic batteries.

Amber.—A yellowish, resinous substance found as a fossil in alluvial soils.

American Morse Code.—The telegraphic code invented by Morse, and used almost exclusively in the United States.

American Wire Gauge.—The name by which the Brown & Sharpe wire gauge is known, in which the diameter of the largest wire, No. 0000, is 0.46 inches, and wire No. 36, 0.005 inches, and all other diameters progress geometrically.

Ammeter.—Any sort of galvanometer which can measure the strength of currents in amperes directly.

Amorphous.—Devoid of definite crystalline form.

Amperage.—The number of amperes which pass through a circuit in a stated time.

Ampere.—The accepted unit of electric current. A flow of electricity at a rate which transmits one coulomb per second. The current which could pass through a circuit that offered a resistance of one ohm under a one-volt electro-motive force.

Ampere-Hour.—A unit of quantity equal to the amount of electricity transmitted by one ampere flowing during one hour.

Ampere-Hour Efficiency of Storage Battery.—The rate between the ampere-hours consumed from and those supplied to a storage battery in a cycle of charge and discharge.

Ampere-Turn.—A unit of magneto-motive force equal to the force resulting from the effect of one ampere passing around a single turn of wire.

Ampere's Rule for Deflection of Needle.—The deflection of the north-seeking pole of a magnetic needle by a current at the left of an object assumed to be facing the needle from a point in the current.

Amyloid.—A material used in making incandescent lamp filaments and which is obtained by subjecting cellulose to the action of sulphuric acid. A cellulose parchment.

Amyloid Filament.—A filament made of amyloid.

Analysis.—The resolution of any object into its constituent or original elements in order to determine its composition.

Analysis Electric.—The resolution of a compound substance into elementary constituents by electrical process in order to determine its composition.

Anchored Filament.—A means providing for the support of an incandescent lamp filament at its center in order to obviate injury by too violent vibration.

Anemometer.—An instrument for measuring the force and velocity of the wind.

Anemometer, Electric.—An instrument for recording the force and direction of the wind by use of electricity.

Aneroid Barometer.—An instrument for measuring atmospheric pressure, the action of which, depends upon the varying pressure of the atmosphere upon the elastic top of a metallic box from which the air has been exhausted.

Angle.—The difference in direction of two lines in the same plane that meet in a point or that would meet if sufficiently extended.

Angle of Lead.—The forward angular departure from the established position, which the collecting brushes must be required to undergo on commutator of a continuous current generator, to the end, that quiet commutation may be obtained.

Animal Magnetism.—A term applied to the phenomena of hypnotism, mesmerism, etc.

Annealing.—A process for softening metals by first heating and then permitting them to cool gradually.

Annealing, Electric.—An annealing process by means of electric heat instead of heat produced in the ordinary way.

Annunciator Board.—A board equipped with annunciator drops.

Annunciator Drop.—A signal, which when it drops, announces the closing or opening of the circuit of an electro-magnet connected with the annunciator.

Annunciator Wire.—Insulated wire of a kind adaptable to annunciator circuits.

Anode.—The positive pole of an electric battery, or preferably the path by which the current passes out and enters the electrolyte on its way to the other pole; opposed to the cathode.

Anomalous.—Deviation from a general rule. Abnormal. Irregular.

Anomalous Helix.—A helix wound in such manner as to create an anomalous magnet.

Anomalous Magnet.—A magnet having more than two free poles.

Anomalous Magnetization.—The magnetization which the vibrating discharge of a Leyden jar or condenser produces. Magnetization from which more than two free poles in a magnet result.

Answering Jacks.—The jacks in a panel of a telephone switchboard which are connected with those subscribers whose calling drops are in the same panel, in order that each call may be promptly answered at a contiguous jack.

Anti-Induction Telephone Cable.—A telephone cable which, by reason of a particular arrangement of its conductors, neutralizes the effects of induction caused by neighboring circuits. A telephone cable which is protected from the effects of electrostatic

induction from adjacent circuits by a covering of metal which is grounded at fitting intervals.

Antimonious Lead.—A compound of lead and antimony, which, being proof against the action of a charging current, is used for the grid of a storage battery.

Aperiodic.—Not possessing periodicity. Attaining repose without vibrations.

Aperiodic Galvanometer.—A galvanometer the needle of which attains repose without vibrations. A dead-beat galvanometer.

Apparent Electro-motive Force.—The apparent acting of the E. M. F. in a circuit, as measured by the drop of pressure occasioned by the resistance of the circuit, and the force of current flowing through it.

Aqueous Solution.—Substances dissolved in water.

Arc.—A segment of a circle. A voltaic arc.

Arc.—To discharge in voltaic arc form.

Arc-Circuit Cut-Out.—A cut-out used in a series arc-light circuit to obviate the breaking of the whole circuit in the event of the extinguishment of any one lamp.

Arc-Lamp, Electric.—An electric lamp which derives its light from the voltaic arc. An incandescent lamp used in observatories to light the circles of telescopes and other instruments.

Arc-Lamp Hanger.—A board from which an arc-lamp hangs and is equipped with electric connections.

Arc-Lamp Spark-Arrester.—A gauze protector enclosing the arc, to guard against fire where arc lamps are used in dangerous proximity to combustible materials, as in store windows.

Arc-Light.—The carbon voltaic arc light.

Arc-Light Generator.—A dynamo electric machine which supplies arc-light circuits with the current.

Arc-Light Projector.—An arc lamp provided with a reflector for obtaining a beam of approximately parallel rays of light.

Arc Plug-Switchboard.—A switchboard equipped with spring-jacks contacts and which connect with the terminals of various circuits and plug switches connected to dynamo terminals, so that the connection between any dynamo and any circuit can be made. Several circuits connected to the one dynamo, or several dynamos located in the same circuit.

Arc Standard of Light.—A standard obtained by means of the photometer, determining the intensity of the light which is given out by a certain predetermined crater area of the positive carbon of a carbon arc.

Aerometer.—An instrument for measuring the specific gravity of fluids.

Areometry.—The act of measuring the specific gravity of fluids.

Armature.—A body of iron or other material susceptible to magnetization and which is placed on or contiguous to the poles of a magnet. That part of a dynamo electric machine termed: the armature.

Armature Bars.—Heavy conductors used for armature windings. Heavy copper bars used instead of the usual wire windings on large drum armatures, and in form of rectangular cross-section strips.

Armature Binding Wires.—Wire coiled on the outside of the armature wires to preclude the separation,

by centrifugal force of the armature wires from the core.

Armature Bore.—The space allowed for the rotation of an armature between the pole pieces of a dynamo.

Armature Core.—The body of laminated iron which carries the coil conductors of dynamos and motors.

Armature Loop.—The single conducting loop on a dynamo armature.

Armature of Dynamo.—An iron core around which is wound coils of insulated wire. That part of a dynamo which generates useful currents or differences of potential. The part of a dynamo which rotates between the field magnets or pole pieces. That part of the dynamo which generates E. M. Fs. by the magnetic flux successively filling and emptying the coils.

Armature Pinion.—A wheel with teeth attached to the armature shaft of a surface car motor, whose function is to engage the teeth of the reducing gear.

Armature Pockets.—Spaces allowed in the core of an armature to receive the armature coils.

Armature Projections.—The sections of an armature core which intervene between the slots and pockets.

Armature Reaction.—The reactive magnetic effect, resulting from the action of the current in the armature of a dynamo, on the magnetic circuit of the machine.

Armature Slots.—The slots in an armature core intended to receive the armature coils.

Armature Spider.—A frame-work of metal attached with keys to the armature shaft and equipped with

arms projecting radially and serving to hold the armature cores solidly.

Armature Stampings.—Stampings of sheet iron employed for the core discs on laminated armature cores.

Armature Varnish.—A varnish with insulating properties used on armature windings to increase their resistance against friction and moisture.

Armored.—Protected by armor, as of cables protected by sheathing.

Artificial Illumination.—Light obtained from artificial sources.

Astatic.—Having no magnetic power of direction.

Astatic Galvanometer.—A galvanometer equipped with an astatic needle.

Asynchronous.—Happening or acting without simultaneity.

Asynchronous Alternating-Current Motor.—A motor, the speed of which is not simultaneous with that of its driving generator; the two machines having an equal number of poles.

Atmosphere.—The entire mass of aeriform fluid surrounding the earth. The weight or pressure of gas or fluid on a unit of surface: 14.73 pounds per square inch at sea level.

Atmospheric Electricity.—Electricity free in the atmosphere.

Atom.—An ultimate particle of matter—the smallest particle of simple matter.

Atomic.—Pertaining to or consisting of atoms.

Atomize.—The separation with an atomizer of a fluid into a spray. To reduce to atoms.

Attachment Plug.—A plug introduced into a screw socket, or spring jack, to facilitate the connection of lamps, etc., to a circuit.

Attract.—To draw to.

Attraction of Gravitation.—The attraction of force by which all bodies or particles of matter in the universe tend toward each other. The attraction of the earth which causes all bodies of lesser mass within its influence to fall upon it.

Attractions and Repulsions of Currents.—The attraction or repulsion exerted by active circuits upon one another, due to the mutual action of their magnetic fields.

Aurora.—A luminous meteoric phenomenon appearing only in the night, displaying itself in streams and flashes of light, ascending toward the zenith from a dusky bank a few degrees above the northern horizon.

Aurora Australis.—A light similar to the Aurora Borealis, appearing in the southern skies.

Aurora Borealis.—The northern light.

Automatic Make-and-Break.—A contrivance which enables the to-and-fro movement of the armature of an electric magnet to make and break its circuit automatically.

Automatic Overload-Switch.—An automatic electromagnetic switch introduced in a circuit which causes it to open automatically when the discharging current surpasses a fixed, safe limiting force.

Automatic Regulation of Dynamo—Electric Machine.—That regulation of a dynamo electric machine which automatically maintains, invariable, the

strength of current, or the potential difference at the terminals.

Automatic Regulation of Motor.—That regulation of a motor which preserves its speed constant.

Automatic Circuit-Breaker.—A contrivance by means of which a circuit is automatically opened when carrying an excessive current.

Automatic Cut-Out for Storage Battery.—An automatic electro-magnetic switch, introduced into a storage battery's charging circuit, in order that the charging circuit may be opened in case the current fails to enter the batteries.

Automatic Fire-Alarm.—A device so adjusted as to telegraph automatically an alarm of fire from any place when its temperature is increased above a certain degree.

Automatic Telephone Exchange.—A telephonic exchange operated upon a system which enables the subscribers to communicate with each other independent of an operator.

Automatic Telephone Hook.—A telephone switch which operates automatically when the receiver is taken off or hung upon it.

Automatic Time Cut-Out.—A contrivance for automatically cutting a translating device or a source of electric power from a circuit after the expiration of a certain predetermined time.

Automobile.—Containing the power of self movement.

Automobile Torpedo.—A torpedo containing the power to propel itself.

Auxiliary Bus.—An auxiliary pressure to which a cen-

tral station bus-bar is connected. Not the main station pressure; but one differing from it.

Average Efficiency of Motor.—The efficiency of an electric motor founded on its mean load. The ratio of a motor's performance in a specified time to the electric power it has consumed in the same time.

Average Life of Incandescent Lamp.—The average length of time that a number of incandescent lamps, on a circuit of specified pressure, will burn without breakage.

B.

B. S. G.—An abbreviation of British standard gauge.

B. & S. W. G.—An abbreviation of Brown and Sharp's wire gauge.

B. T. U.—An abbreviation of British thermal unit.

B. W. G.—An abbreviation of Birmingham wire gauge.

Back Pitch.—The pitch backward of the windings of an armature.

Back-Turns of Armature.—Turns of an armature current which have a tendency to demagnetize the field. Back ampere turns.

Backward Pitch of Armature Windings.—A pitch invariably left-handed when viewed from commutator side.

Bad Earth.—A name given to a bad ground, or an earth connection with a comparatively strong electric resistance.

Baking Oven, Electric.—A bake oven heated by electricity.

Balance Photometer.—A photometer founded on the dissolution of iodide of nitrogen by the process of light action.

Balanced Armature.—An armature having its weight apportioned with regularity as referred to its axis of rotation. An armature set in order by the use of additional weights, so that its weight is apportioned uniformly as referred to its axis of rotation.

Balanced Load.—A load uniformly apportioned to two or more generating units as observed in the polyphase systems of distribution, or the three-wire, five-wire, multiple.

Balanced Polyphase System.—A polyphase system with all its branches proportional with reference to their electro-motive force and phase.

Balanced Resistance.—A resistance arranged in a bridge in such a manner that it will be balanced by the residuary resistance in the bridge.

Balancing Coil of Armature.—A subsidiary field-winding in series with an armature with its magneto-motive force equal and opposite to that of the armature current, obtaining zero as the total magnetic effect upon the field, leaving the field flux unchanged no matter what the load.

Balancing Resistance for Dynamos.—A governing resistance possessing a range adequate to the balancing of one dynamo against another with which it is worked in parallel.

Bank of Lamps.—An assemblage of electric lamps together in a common structure, ordinarily with a view to acquiring a load.

Bank of Transformers.—An assemblage of transformers together in a common structure, ordinarily with a

view, either to acquire a load, or to modify the pressure.

Bar Armature.—An armature the conductors of which are constructed of bars.

Bar Electro-Magnet.—An electro-magnet with its core presenting the appearance of a straight bar or rod.

Bar Windings.—Armature windings constructed of copper bars.

Bar-Wound Armature.—An armature the conductors of which have the shape of bars.

Bare Carbons.—Arc light carbons which are not electroplated with copper.

Barometer.—An instrument for determining the weight or pressure of the atmosphere.

Barometric Column.—A column ordinarily of mercury, about 30 inches in perpendicular, supported in a barometer by the pressure of the atmosphere.

Bar Winding of Armature.—A winding composed of copper bars joined together at their extremities and insulated.

Basis Metal of Electro-Plating.—A metal upon the surface of which a deposit is to be made by electroplating.

Battery.—A term often applied to an electric battery.

Battery Gauge.—A movable galvanometer appropriate for common battery-testing work.

Battery Jar.—A jar employed to hold the electrolyte of each separate cell of a primary or secondary battery.

Battery Lamp.—An incandescent lamp which by reason

of its low voltage can be worked by the voltage of a battery having a few series-connected cells.

Battery Motor.—An electric motor wound in such manner as to admit of operation by a comparatively low power, such as that of the common battery.

Battery of Generators.—Several generators connected in such manner as to obtain the action of a single generator.

Battery Solution.—The fluid or electrolyte of the primary or secondary cell.

Battery Syringe.—A syringe employed for emptying a voltaic battery of acids or liquids which have lost their potency, or for replenishing it with live liquid.

Becquerel Radiation.—A radiation discovered by Becquerel, which is invisible and which is given out by some salts, notably salts of uranium, and which has the power to permeate many opaque bodies impenetrable by ordinary light, and affecting a photographic plate.

Bega.—The prefix for one billion, one thousand million or 10^9 .

Beg-Ohm.—A billion ohms. One thousand megohms.

Bell-Hanger's Joint.—A joint made by looping the ends of wires into each other.

Bell-Shaped Magnet.—A horse-shoe magnet as if fashioned from a section of split pipe, the approached poles being semi-circular.

Belt-Driven Generator.—A generator operated with a belt instead of a direct or rope-operated generator.

Belt, Electric.—A body belt supposed to consist of voltaic or thermo-electric couples and used for certain assumed therapeutic efficacy.

Belt Speed.—The rapidity of a belt's movement in transmitting power.

Bichromate Voltaic Cell.—A zinc-carbon couple used with bichromate of potash and sulphuric acid in aqueous solution.

Bicro.—The prefix for a one-billionth, a one thousand millionth of 10^9 .

Bicro-Ampere.—A billionth of one ampere.

Bight of Cable.—One loop or bend only of cable.

Binding Coils or Binding Wires.—Coils of wire with which the outside of an armature is bound at right angles to it, to obviate the loosening of the armature coils by centrifugal force while the member is in rotation.

Binding Post.—A binding screw of metal solidly fastened to a machine to facilitate the making of secure electric connection.

Biograph.—A machine which reproduces on a screen the actual movements of objects by the exhibition of pictures in rapid succession.

Bipolar.—Possessing two poles.

Bipolar Armature-Winding.—An armature-winding adaptable to service in a bipolar field.

Bipo Armature-Winding.—An armature-winding adaptable to service in a bipolar field.

Bipolar Generator.—A dynamo-electric machine having two poles.

Bipolar Magnetic Field.—A magnetic field consisting of two opposed magnetic poles.

Birmingham Wire Gauge.—A wire gauge used in England.

Black Electro-Metallurgical Deposit.—A black electro-metallurgical deposit precipitated from the metal in a plating bath and due to the use of a current of excessive strength.

Blake Telephone Transmitter.—A style of carbon transmitter.

Blasting, Electric.—The explosion of powder or other explosives in a blast by means of electric ignition.

Blavier's Test.—The localizing of a single fault on a single telegraph line or conductor by means of the test brought into practice by Blavier, and which is accomplished by gauging the resistance at one end, while the other end is alternately freed and earthed.

Block System for Railroads.—A system of block signals employed in railroad train service to prevent collisions; the road being divided into sections of certain lengths, with towers situated at the end of these sections, having telegraphic intercommunication, providing for the display of proper signals, thereby preventing more than one train or engine from occupying the same section or block at the same time.

Blow.—To fuse a safety fuse.

Blowing a Fuse.—The melting or fusing of a safety fuse resulting from the passage of the current through it exceeding the carrying capacity of the strip.

Blowing Point of Fuse.—That degree of current strength which melts or blows the fuse.

Bobbin, Electric.—A coil of wire, insulated, and adaptable to an electric current employed for any purpose—for instance: in energizing electro-magnets.

Bolometer.—A machine to measure minute differences by means of electricity. A thin wire or strip, the resistance of which is modified incident radiant energy.

Bonded Rails.—Rails which are used in an electric system as a section of the current, and which are properly jointed at their ends in order to insure perfect electric contact.

Bonding Resistance of Rail.—The resistance presented at the bonded joints of a rail circuit.

Booster.—An auxiliary electric dynamo placed in a particular feeder or assemblage of feeders in a distributing system in order to increase the pressure of that particular feeder or assemblage beyond the pressure of the rest of the system.

Boring, Electric.—Making holes in metals with voltaic arc heat.

Bougie-Decimale.—The standard candle of France.

Bougie-Metre.—The unit of illumination, frequently termed a lux, and equal, at a distance of one metre, to the illuminating power of a bougie-decimale.

Box Bridge.—An electric bridge in which the two arms together with the ascertained resistance, consists of standard resistance coils inclosed in a box.

Boxing the Compass.—Calling in consecutive order the names of the points of the compass, beginning at any given point.

Brake Arm.—A lever by which the power is applied to a brake shoe, to which it is connected.

Brake Shoe.—A metal casting conforming in shape to an arc of the car wheel circumference, and which

is pressed against the wheel by the operation of the connected lever in order to stop the car.

Braided Wire.—A wire insulated with a cover of braided material.

Branch.—Any conductor in a system of parallel distribution into which taps and outlets are made.

Branch Block.—A block of porcelain with grooves into which the terminals or conductors are put to make a connection to the mains with a pair of branch wires.

Branch Circuits.—Extra circuits located at points of a circuit at which the current branches, where some of the current flows through the branch and the rest passes through the initial circuit.

Branch Coupling Box.—A coupling box adaptable to making a connection for house service with the mains supplying the house.

Branch Cut-Out.—A safety fuse introduced between two branch wires and the mains from which they receive their supply.

Branch Fuse.—A safety fuse or branch cut-out.

Branding, Electric.—The heating to incandescence of a branding implement electrically instead of in the usual way.

Breadth Coefficient of Armature Coil.—The relation of the efficient electro-motive force induced in an armature coil to that which would be induced in a coil with breadth; that is to say, if the whole of it were compressed to occupy the space of a single turn only.

Break.—Any failure of the continuous conductivity in a circuit.

Break-Down Switch.—A panel switch used for connecting the positive and negative bus-bars in a little three-wire system in order that it may be transformed into a two-wire system, so that in the event of a break-down the system can be supplied with a current from one dynamo only.

Breaking Capacity of Switch.—The strength of current which a switch is capable of interrupting safely, as distinguished from its carrying capacity.

Breaking Down of Dielectric.—The weakening of a dielectric under electric pressure which allows disintegrating discharges to pass through its substance.

Breaking Down of Insulation.—The impotency of insulating material manifested in the disruptive passage through it of an electric discharge.

Breaking In.—The interruption of a telegraph message in transmission between two points by the attempt of an intermediate operator to use the line at the same time.

Bridge, Electric.—A device employed to measure an unknown electric resistance. A contrivance used to measure unknown resistances by comparison with adjustable ones.

Bridge-Wire.—A wire in a Wheatstone's Bridge in which the galvanometer is set.

Bridging-Bell Telephone System.—A telephonic system of communication where the call bells are arranged in multiple arc and by which the two-line conductors of metallic circuit are permanently bridged to the ground in grounded circuits; thus a call sent out rings every bell in the line, indicating by means of a code of signals the particular station needed.

Bright Deposit.—A shining surface of metallic deposit resulting from a special final process in the electroplating of silver.

Brother-in-Law.—A concealed bell, corresponding in sound with that of the fare indicator, and rung instead of the car indicator bell, by dishonest conductors, when fares have been collected.

Brush Contact-Surface.—The part of the surface of a commutator which is at any instant of time in contact with the brushes.

Brush-Holder Cable.—A stranded conductor used in a dynamo or motor to obtain direct connection with the brushes.

Brush Holders for Dynamo-Electric Machine.—Contrivances by means of which the collecting brushes of a dynamo-electric machine are supported.

Brush Rocker.—A contrivance in a dynamo which serves to shift the brushes on the commutator from one position to another.

Brush Shifting Device.—A modified style of brush rocker.

Brushes of Dynamo-Electric Machines.—An assemblage of wires in a bundle, narrow piece of metal, carbon plates or metallic plates slit, which press against the commutator cylinder, carrying off the current generated.

Bucking.—A term expressing the action of a street car when it stops suddenly, as though it had collided with another car, and resulting from the opposition between two motors.

Buckled Diaphragm.—A defect in the transmitter or receiver of a telephone caused by warping of the diaphragm.

Buckling.—A warping in the surface of the storage cell plates due to a too rapid discharge.

Bug.—In quadruplex telegraphy, a term serving to designate any defect in the working of the apparatus. Usually applied to a defect in the working of any electric apparatus.

“Building-Up” of Dynamo.—The action by which a dynamo-electric machine, after starting up, speedily attains its maximum E. M. F.

Bullet Probe.—A probe with electric conductors adjusted in such manner as to effect the closing of an electric circuit and the operation of an electric signal when the probe comes in contact with the bullet.

Bunched Cable.—A cable having more than one wire or conductor.

Bunsen Screen.—The screen of a Bunsen photometer.

Buoy, Electric.—A buoy displaying luminous signals produced by electricity.

Burette.—A graduated glass tube with a small aperture and stop cock used to deliver measured quantities of liquid.

Buried Cable or Conductor.—A cable placed underground, directly in the earth, and not in a conduit or subway.

Burn-Out.—The damage sustained by an armature or any member of an electric machine resulting from an excessive current due to short circuit and different causes.

Burned-Out Incandescent Lamp.—An incandescent lamp which, by reason of long continued service, has lost its capacity to furnish light.

Burning at Commutator of Dynamo.—An arcing effect at the brushes of a dynamo-electric machine arising from poor contact or imperfect position, by reason of which the circuit loses energy and the commutator segments or brushes are destroyed.

Bus-Bar Connectors.—Connectors used to connect or unite the ends of bus-bars.

Bus-Bars.—Bars which receive the entire current generated and which are composed of heavy conducting metal and connected directly with the poles of one or several dynamo-electric machines.

Butt Joint.—A joint made by soldering the wires together end to end.

Buzzer, Electric.—A call emitting a buzzing sound obtained by the use of a rapid automatic contact-breaker.

C.

C. G. S.—An abbreviation of centimetre-gramme-second.

C. P.—An abbreviation of candle-power.

C. G. S. Units.—Centimetre-gramme-second units.

Cable.—A cable for conveying electricity. A message sent through an electric cable.

Cable Box.—A box employed to receive and protect a cable head.

Cable Drum.—A drum in machinery for handling cable and upon which it is wound, keeping it in most convenient shape for shipping, laying, etc.

Cable Head.—A board, rectangular in form, and equipped with binding posts and fuse wires, used to re-

ceive the wires at the point where they enter a cable in overhead lines.

Cable Tank.—A stout water-tight tank carried on a cable ship and which serves to hold a section of cable coil which is ready to lay.

Cable Transformer.—A transformer of alternating current, the primary and secondary conductors of which are formed like a cable covered with an iron sheath or magnetic circuit.

Cadmium Standard Cell.—A standard voltaic cell showing an exceedingly low temperature coefficient of change in E. M. F. and using a cadmium-zinc couple.

Calculagraph.—A machine for recording the time that the line is used by a subscriber when communicating by long distance telephone.

Cal-Electric Generator.—A generator the performance of which is contingent upon the generation of the electric fluid in the secondary coil of a transformer, effected by variation of temperature in the iron core of transformer.

Cal-Electricity.—The electricity in the iron core of a transformer resulting from change of temperature.

Calibrate.—To ascertain the complete or relative values of the indications of electrical instruments, i. e.: voltmeters, electrometers, galvanometers, wattmeters, etc.

Calibrating.—Ascertaining and designating the values or indications of a voltmeter, electrometer, galvanometer, wattmeter, etc.

Call-Bell, Electric.—An electric bell employed to attract the attention of an operator and advise him

that he is wanted at the instrument for communication.

Calling Drops.—A drop used to indicate the person calling and employed in isolated-station switchboards.

Calling Plug.—The one of two plugs at a central station which is put into the jack of a subscriber who is called for and through which he is signaled to the telephone.

Calorescence.—The change of heat rays, which are in an obscure state, into luminous rays by impact with solid bodies.

Caloric.—A term applied formerly to the principle of heat or the agent to which the phenomena of heat and combustion were ascribed.

Calorie.—A unit of heat. The degree of heat necessary to raise 1 gramme of water 1 degree centigrade.

Calorific Intensity.—The temperature reached in combustion.

Calorimeter.—An apparatus for measuring the amount of heat contained in bodies.

Calorimetric Conductivity.—The conductivity of a substance founded upon the amount of heat transferred in a specified time, without considering the temperature reached.

Candle.—A unit of photometric energy. The photometric energy equal to the product of a standard candle burning at a rate of two grains a minute.

Candle-Foot.—A unit of illumination equal at a distance of one foot to that which is given out by a standard British candle.

Candle-Power.—The intensity of light given out by a lucid body calculated by standard candles. The photometric energy of one standard candle.

Canopy Switch.—A switch located overhead at each end of a trolley car which enables the motorman to turn the current on or off the car at will.

Caoutchouc.—A vegetable substance obtained from the juice of certain tropical trees valued for its superior insulating properties. Commercial india-rubber.

Capability of Dynamo-Electric Machine.—The maximum energy in theory, of a dynamo obtained by dividing the square of its electromotive force by its resistance.

Capacity of Accumulator.—The product of a storage battery expressed in watt-hours or ampere-hours.

Capacity of Condenser.—The quantity of electricity that a condenser can hold in coulombs when charged to a one-volt pressure.

Capillarity.—The rise and fall of liquids in conduits, the inside diameters of which are very small.

Capillary.—Resembling a hair; fine minute, small in diameter.

Capillary Attraction.—The cause which determines the ascent or descent of a fluid in a capillary tube above or below the surrounding fluid.

Capsizing Thermometer.—A thermometer for deep-sea soundings, used in cable work, the position of which is reversed or upset when the lead begins to ascend from the bottom, thereby securing a record of the temperature.

Car Body.—All that part of a railroad car resting upon the trucks, and designed for the accommodation of passengers. A frame-work of wood.

Car Controller.—A contrivance employed to control the movement of a trolley car and which is placed at each end of the car in order that the motor can readily stop, reverse, and regulate the speed of the car.

Car Heater, Electric.—A heater deriving its heat supply from the action of electricity and composed of coils of insulated wire crossed by an electric current.

Car-Lamp, Electric.—An incandescent lamp used in street railway cars, and ordinarily supplied with an anchored filament.

Car Truck.—That part of a car which carries and sustains the weight of the body.

Carbon.—An elementary substance, not metallic, in nature, which predominates in all organic compounds and occurs in three distinct allotropic forms: black lead, charcoal and the diamond.

Carbon Brushes for Electric Motors or Generators.—Artificial carbon plates used as brushes for dynamos or motors.

Carbon Diaphragm of Telephone.—A light sheet of metal serving as a diaphragm in some forms of transmitters.

Carbon Electrodes for Arc Lamps.—The carbons between which the arc of an electric arc lamp is maintained.

Carbon Holder.—A device used in arc lamps to support the carbon.

Carbon Motor Brush.—A carbon brush used on a motor.

Carbon-Point Lightning-Arrester.—An arrester wherein the disruptive discharge occurs between opposed carbon points.

Carbon Rheostat.—A resistance formed of carbon plates and powder and adjusted so that it can be modified by pressure.

Carbon Telephone Transmitter.—A telephone transmitter the operation of which is contingent upon the variation in resistance of a carbon button, or a quantity of loose granulated carbon, on the back and forth movement of the diaphragm.

Carbonic Acid Gas.—A gas formed by the uniting of one part of carbon with two parts of oxygen.

Carbonize.—To convert into carbon by combustion, by the action of fire or concentrated acids on carbonizable substances.

Cardew Voltmeter.—A voltmeter which, by means of a long fine wire whose expansion, resulting from the passage through it of the current to be measured, makes the indication.

Carrying Capacity.—The maximum carrying strength which a wire is capable of carrying.

Case-Hardening.—The hardening of the outside of metals with heat generated by electricity.

Cast Rail-Bond.—A bonding obtained by uniting track rails in a trolley system with molten iron cast around all but the upper part of the joint.

Catalysis.—An influence exerted on chemical decomposition by certain substances, which produce changes in the affinities of other substances, merely by contact, and without experiencing any changes themselves.

Cataphoresis.—The tendency to mix or become equably diffused as referred to electricity. Electric osmose.

Cataphoretic Electrode.—An electrode which holds in

solution the chemical which is to enter into the body by cataphoresis. The anode.

Centenary Curve.—The curve or sag formed by the weight of a wire hanging freely between two points of suspension.

Cathelectrotonus.—The augmentation of functional activity produced in a nerve in the vicinity of the negative electrode or cathode, in the practice of electro-therapeutics.

Cathode.—That part of a battery by which the electric current leaves substances through which it passes, or the surface at which the electric current passes out of the electrolyte; the negative pole.

Cathode Rays.—Rays emitted by the cathode or negative pole of an X-ray tube.

Cathodogram.—A picture obtained by means of the X-ray.

Cauterization.—The act of searing or burning with fire, or with a heated object or caustic substance.

Cauterization, Electric.—The act of cauterizing by the application of an electrically heated wire.

Cautery Battery.—A term in electro-therapeutics applied to a multiple-connected voltaic battery suitable for producing incandescence for cauterizing purposes.

Ceiling Block.—Blocks attached to the ceiling, from which flexible cords can be suspended and connected with the supply wires of an incandescent system.

Ceiling Board.—A board attached to the ceiling from which to hang arc lights.

Ceiling Fan.—A fan suspended from the ceiling and driven by electric power.

Ceiling Rosette.—An ornamental ceiling block in form of a rose.

Celluloid Lamp-Filament.—A filament made of carbonized celluloid.

Centi.—A prefix indicating the one hundredth part.

Centi-Ampere.—The one hundredth of an ampere.

Centigrade Thermometer Scale.—A thermometer scale whose thermometric tube is divided into one hundred equal degrees between the melting point of ice and the boiling point of water.

Centimetre.—The one hundredth of a metre. 0.3937 inch.

Centimetre-Gramme-Second System.—A system taking the centimetre as its base for the unit of length, the gramme for the unit of mass and the second for the unit of time.

Central.—A term applied to any central telephone office or exchange.

Central Lighting-Station.—A station where are located the generators and distributing machinery that furnish the current to the lamps in a certain district.

Central-Station Lighting.—The supplying from a central station of the current which lights the lamps in a manner of houses and structures.

Central Telephone Exchange.—A central office with which a number of subscribers or telephone stations are connected. A central exchange with which a number of local exchanges are connected.

Cement-Lined Conduit.—A conduit constructed with any suitable material, such as metal, stone or wood, having ducts whose surfaces are lined with cement.

Centre of Distribution.—Any point in an incandescent distribution system where the supply current is branched or distributed radially to mains, sub-mains or transferring devices.

Centre of Gravity.—That point of a body about which all its parts are balanced.

Centre of Oscillation.—That point of a body which, describing the movement of a pendulum, is neither accelerated nor retarded during its oscillatory movements by those parts of the pendulum which are located above or below it.

Centre-Pole Construction.—A system of construction by the use of poles, and employed in double track trolley systems; the poles being set between the two tracks and equipped with bracket arms which extend over the tracks and from which the trolley wire is suspended.

Centrifugal Force.—That force by which a body in rotary motion tends to fly off from the axis of motion.

Centrifugal Governor.—A device serving to keep constant the speed of a steam engine or other motor regardless of any changes in its load or performance.

Centrifuge.—An apparatus employed in the separation of fluids differing in consistency and of solids from fluids by centrifugal force.

Centripetal.—Tending toward the center.

Change-Over Switch.—A switch employed in a central

station to change a working circuit from one dynamo, or battery of dynamos, to another.

Characteristic Curve.—A diagram in which the relation of varying values is represented by a curve. A curve which shows the peculiar properties of a dynamo operating under various phases.

Characteristics of Sound.—Peculiarities by which musical sounds are distinguished one from another, i. e.: pitch, tone, intensity, quality, loudness.

Charged Body.—A body which is charged with electricity.

Charging Current.—A current used to charge an accumulator or storage battery.

Chemical Affinity.—The attraction of one atom for another. That force which urges atoms to combine and produce molecules.

Chemical Change.—The formation of new molecules by any change in matter following the combustion of atoms.

Chemical Effect.—That effect produced by atomic combination in which the individual characteristics and properties of the substances entering into such combination are lost. A combination of atoms through which new molecules are formed.

Chemical Photometer.—A photometer which determines, by the amount of chemical action produced in a specified time, the intensity of the light to be measured.

Chemical Separation.—Chemical dissolution or decomposition.

Chloride Storage Cell.—A term applied to a storage cell, the plates of which are made of grids of anti-

monious lead molded around small knobs of fused chloride of lead and which are transformed into spongy metallic lead and lead peroxide on the negative and positive plates, when brought under the action of a charging current.

Choking Coil.—A coil of wire wound in such manner on a core of iron as to acquire self-induction to a high degree when employed on alternating current circuits.

Choking Effect.—The effect resulting from the obstruction or cutting off of an alternating current by a choking coil, effected with a smaller loss of force than it would accomplish as an ohmic resistance only.

Chronograph, Electric.—An electric apparatus employed to measure and register small intervals of time automatically.

Cigar-Lighter, Electric.—An apparatus employed to light cigars by electricity.

Cinematograph.—A biograph.

Cipher Code.—A code employing arbitrary words to represent other words or phrases.

Circuit Breaker.—A device serving to open or break a circuit.

Circuit, Electric.—The path covered by an electric current in its passage through a conductor from its starting point back again.

Circular Flux.—A term applied to the concentric circular flux surrounding an active cylindrical conductor.

Circular Mil.—A unit of area taken to measure the cross-section of wires, or about 0.7854 square mils. A circle area of one mil diameter.

Circular Millage.—The area of wire or conductor cross-sections denoted in circular mils.

Circumferential Speed.—The velocity of a point on the circumference of a revolving wheel or armature.

Clearance.—That space in a dynamo or motor between the surface of a revolving armature and the polar surface of the field magnets.

Cleat Wiring.—Fixing electric conductors or wires to ceilings or walls by the use of adaptable insulating cleats.

Clockwise Motion.—A motion which when observed from the face corresponds with the rotary motion of the hands of a clock.

Clockwork Feed for Arc Lamps.—An arc lamp contrivance providing for the feeding of the carbons. An arrangement of wheel work.

Closed Circuit.—A circuit completed.

Closed-Coil Armature.—An armature whose coils are not on open circuit while rotating. A dynamo armature the coils of which are assembled in sections and so connected with the bars of a commutator as to be continuously connected in a closed circuit.

Closed-Coil Winding.—A winding providing for the connection of the armature coils while the machine is in operation.

Closed Iron-Circuit Transformer.—A transformer having a core which makes a completed magnetic circuit. A transformer which is iron-clad.

Closed Magnetic Circuit.—A magnetic circuit lying entirely in iron or other material which is highly permeable by magnetic energy.

Clutch for Arc Lamps.—A form of clutch for arc lamps to hold carbons.

Clutching Device.—A device used to hold the carbons in an arc lamp or for holding any object which is subject to motion.

Coarse Winding of Field Magnets.—The series winding of a compound wound machine.

Coefficient of Expansion.—The augmentation in the fractional length of a rod or bar when subjected to heat ranging from 32 to 33 degrees Fahr. or 0 to 1 degree Cent.

Coefficient of Hysteresis.—The work given out in the cubic centimetre of iron or any magnetic material during one cycle of unit magnetic flux density. The coefficient from which is obtained the hysteretic activity when it is multiplied by the volume of iron, the alternating frequency and the one-sixth power of the maximum flux density.

Coefficient of Inductance.—A fixed quantity which, multiplied by the current strength flowing through a coil or circuit, will numerically stand for the flux linkage with such coil or circuit resulting from that current. A term applied at times to coefficient of self-induction.

Coefficient of Reflection.—The percentage value denoting the ratio of intensity of a reflected ray to that of an incident ray.

Coercive Force.—The resisting power to changes in magnetization. The demagnetizing power which must be employed to completely demagnetize a magnetic substance, in cyclic magnetization.

Coherer.—Conducting particles constituting a semi-

conducting bridge between two electrodes and serving to detect electro-magnetic waves.

Coil, Electric.—A coil or spool of insulated wire providing for the passage through it of an electric current.

Coked Core of Incandescent Filament.—A filament for incandescent lamps, the core of which is electrically coked carbon and the surface of which is coated with a carbon deposit by the flashing process.

Coked Filament.—A filament of carbon for incandescent lamps which has been freed from gases and converted into a variety of coke by being subjected to electric heat in a vacuum.

Cold Light.—Luminous radiation unattended by obscure radiation. Fire-fly or glow-worm light.

Collecting Brushes of Dynamo-Electric Machine.—Brushes which press against the commutator cylinder of a dynamo, bearing away the current generated in the armature coils by the E. M. F. Brushes which press on the collecting rings of an alternating current armature.

Collecting Rings for Alternators.—Rings of metal which are connected to the terminals of the armature coils in an alternator on which the brushes that carry off the alternating currents are in contact.

Collectors of Dynamo-Electric Machine.—Brushes which bear on the commutator cylinder and translate the current generated by rotation of the armature.

Collectors of Frictional Electric Machine.—The points of metal which gather the charge from the glass plate or cylinder of a frictional electric machine.

Collector Rings—An alternator's collecting rings.

Combination Fittings for Chandeliers.—Fittings so arranged as to permit the use of both electricity and gas.

Commercial Efficiency.—That energy, termed useful, produced by any machine, and divided by the total energy it takes in.

Commercial Efficiency of Dynamo, or Generator.—The ratio of the useful electric energy of a dynamo delivered at its terminals, divided by what it takes in or the mechanical power required to drive it.

Commercial Efficiency of Motor.—The ratio between the electric activity taken in at its terminals and the mechanical activity developed at the motor pulley.

Commutator.—A device by means of which alternating currents are changed into continuous ones and vice versa. A device by means of which the direction of electromotive currents in one portion of a circuit is changed in another.

Commutator Bar.—An insulated segment of a commutator.

Compass.—The mariner's compass.

Compass Card.—The card employed in the mariner's compass and upon which is indicated the four cardinal points of the compass: north, south, east and west, and which is also subdivided into 32 points, termed rhumbs, and also divided into degrees circumferentially.

Compensated Alternator.—An alternator serving to maintain a uniform voltage at a given point of its circuit under differing loads; the field magnets of

which are called into activity in some measure by fixed currents taken from a separate generator and to some extent by currents furnished by the load current in the armature.

Compensated Voltmeter.—A voltmeter at central station connected with the bus-bars so that its indications are corrected automatically for the pressure drop in some certain group of feeders or single feeder, resulting in its readings corresponding to the pressure furnished to the mains.

Compensated Wattmeter.—A wattmeter wound in such manner as to insure compensation for the effect of reaction in a shunt circuit.

Complement of Angle.—What is needed to make the value of an angle equal to a right angle or 90 degrees.

Complete Wave.—Two alternations succeeding each other or two alternations of a periodically alternating quantity. A cycle.

Component.—One of the several separate forces into which any one force can be resolved. The separate forces which united produce a single resulting force.

Component Currents.—The currents into which it may be apprehended that a single current can be divided in such manner as to become the equivalent of the single current.

Component Electromotive Forces.—The two or more E. M. Fs. into which any given E. M. F. may be resolved.

Composite Dynamo.—A dynamo of compound winding.

Composite Excitation.—Any exciting of the field mag-

nets of dynamos in which there has been used more than a single winding; for instance: series windings and shut winding.

Composite-Field Dynamo.—A dynamo the field of which has a composite excitation, or is compound wound.

Compound Winding.—A process by which dynamos and motors are wound and where both shunts and series coils are located on the field magnets.

Compound-Wound Continuous-Current Generator.—A continuous current generator the fields of which are compound wound, in order to hold the pressure constant under all loads.

Compound-Wound Motor.—A motor, the field of which is compound wound, in order to keep its speed constant under all loads.

Concealed Wiring.—Wiring laid in the plaster in the interior of structures or hidden from view by passing them through conduits.

Condenser.—A contrivance for augmenting the capacity of an insulated conductor by placing it in contiguity to another earth-connected conductor, but from which it is separated by any intervening body which will allow electrostatic induction to occur through it.

Conduct.—To convey electricity through conductors.
To be able to carry an electric current.

Conducting Power for Electricity.—The capacity of a certain length and area of a regular cross-section of an electric conducting material, in comparison with that possessed by the same length and area of regular cross-section of some other material agreed upon as a standard, as namely: pure copper.

Conductivity, Electric.—A discharge produced by carrying the charge off through a conductor touching the charged body—the opposite of a convective or disruptive charge.

Conductivity Resistance.—The resistance to an electric conductor made by a body, or the resistance offered by a body to the passage of electricity through its mass.

Conductor.—Any material through which the electric current will pass. A substance which has the power to determine the direction which the electric energy will take in passing through the Ether in the dielectric environing it.

Conduit, Electric.—A space underground in which is a number of ducts wherein electric wires or cables are placed.

Conduit Trolley-System.—A trolley system, single or double, whose trolley wires are laid in an underground, slotted conduit, and in which a plow or sled pushed or drawn through the slot is substituted for the trolley-wheel.

Congelation.—The process of passing, or the act of converting from a fluid to a solid state by the abstraction of heat. Freezing.

Connect.—To effect electric contact.

Connecting-up.—The process by which an electric circuit is made.

Consequent Pole.—A magnet pole resulting from the placing together of two free north or south poles. A magnet pole perfected at some point other than the extremities of a magnet.

Consonant Electric Circuit.—A circuit of alternating current having inductance and resistance, with a

secondary current having capacity, inductance and resistance in such way as to cause the neutralization of the inductance of the primary circuit by the inductance and capacity of the secondary. A primary alternating-current circuit without choking effect or reactance, due to the presence of a condenser in a secondary circuit, in distinction from the effect of a condenser introduced directly in the primary circuit.

Constant Current.—A current which always flows in the same direction. A current whose strength is not subject to variation.

Constant-Current Arc-Lamp.—A series connected arc-lamp.

Constant-Current Circuit.—A circuit the current strength of which remains constant despite any changes in resistance.

Constant-Current Dynamo.—A generator with constant current.

Constant-Current Transformer.—A modification in the strength of a constant current.

Constant-Potential Arc-Lamp.—An arc-lamp used on incandescent or constant potential mains.

Constant-Potential Circuit.—A circuit the potential of which is maintained nearly constant.

Constant-Potential Dynamo.—A dynamo which supplies a nearly constant difference of potential notwithstanding changes of resistance or load.

Constant-Potential Motor.—A motor intended to be worked with a constant potential current. Often a motor shunt or compound-wound.

Consumer's Terminals.—The terminals in a system of electric distribution for house service and belonging to the house and at which the supply company delivers the electricity.

Contact Breaker.—A device employed to open or break an electric circuit.

Contact Resistance.—Resistance resulting at the point of contact of several surfaces.

Contact Screw.—A screw tipped with a platinum or other contact and serving to close the circuit of any electric device in the circuit of which it is situated.

Contacts.—Conducting pieces inserted in electric circuits with a view to open and close the circuit at points where it is desirable. A fault in a circuit resulting from any part of the circuit coming accidentally in contact with a conducting object. A metallic cross or back connection between telephonic or telegraphic circuits.

Continuous Current.—An electric current flowing in the same direction only.

Continuous-Current Arc.—A voltaic arc effected by a continuous current and differing from that which results from alternating currents.

Continuous-Current Generator.—A generator which furnishes continuous currents.

Continuous-Current Motor.—A motor worked by continuous currents.

Continuous-Current Transformer.—A dynamotor or motor dynamo. A transformer from one to another continuous pressure and current.

Continuous-Surface Commutator.—A dynamo commutator, the gaps of which instead of containing

air spaces, are filled with insulating material; or one which has no breaks or gaps in its surface between adjacent commutator bars.

Continuous Winding.—A term often used to designate wave or undulatory winding of an armature.

Controller.—A magnet, whose coils, in a system of automatic constant current regulation, are crossed by the main current and which is used to automatically put a regulator magnet into or out of the main current on changes of the current passing. An electric device for governing a circuit or system. An electric shunting device for governing the speed of motors. A controller for street railroad cars.

Controller Resistance.—The resistance used with street car controllers to start and stop motors or for modifying their speed.

Controller Switch.—The switch which works the switch cylinder on a street car controller.

Converging Magnetic Flux.—Magnetic flux which conveys from one or more points.

Conversion of Electromotive Force.—Any enhancement or diminution in the value of an electro-motive force obtained by the employment of a transformer.

Convert.—To modify or transform an electromotive current.

Converted Currents.—Electric currents whose strengths have been enhanced or diminished by use of a transformer.

Converter.—A term applied occasionally to a transformer.

Convolutions of Wire.—The individual loops or turns in a coil.

Cooling Surface of Armature.—The part of the surface of an armature from which it radiates into the environing atmosphere the heat energy in it which results from the passage of the currents generated during its revolution.

Co-Phasal.—Having the same phases.

Co-Phasal Alternations.—Alternations having the same phases.

Copper Bath.—An electrolytic bath holding in electrolyzable solution a copper salt, and a plate of copper forming the anode and put into an electrolyte contiguous to the article to be electro-plated which constitutes the cathode.

Copper Conductivity Standard.—A metre-gramme wire of standard conductivity (in accordance with the rules of the British Institution of Electrical Engineers), with a resistance of 0.1519 international ohm at 15 degrees C., agreeing with Matthiesen's standard for hard copper.

Copper Efficiency.—The relation of the electric power delivered by a copper system to the power delivered to that system.

Copper Fuse-Wire Terminals.—Copper terminals to which the terminals of fuse wires or safety catches are connected.

Copper Loss.—The loss of energy sustained by the current passing through the copper wire of a motor, dynamo or any conducting system.

Copper Plating.—Plating with copper by the electroplating process.

Copper Ribbon.—A style of copper strap.

Copper Tape.—Copper straps or bars used for winding armatures.

Copper-Zinc Accumulator.—An accumulator formed of a copper and a zinc plate immersed in a solution of sulphate of zinc.

Coppered Carbons.—Electrolytically copper-coated carbons for arc-lamps or batteries.

Cord Adjuster.—A device employed to regulate the length of pendant cords.

Cord, Electric.—An electric conductor, flexible and insulated and usually containing two parallel wires.

Core Discs.—Disks cut or stamped out of sheet iron and used for the laminated core of any dynamo electric apparatus.

Core Losses.—The losses sustained by the core of a dynamo, motor or transformer resulting from hysteresis or eddy currents. The Foucault losses.

Core Losses of Transformer.—The losses in the core of a transformer due to hysteresis and Faucault currents. Iron losses in a transformer.

Core Transformer.—A transformer where the wire windings are placed on the core of iron of which it is formed.

Cored Carbons.—Arc-light carbons having a soft center of carbon.

Coreless Armatures of Dynamo or Motor.—An armature of a dynamo or motor which has no iron core.

Corpuscle.—A minute particle or physical atom which composes large bodies; not the elementary principles of matter, but small simple or compound particles such as are not dissolved or dissipated by heat.

Cosine.—A trigonometrical function. The Sine of the complement of an arc of an angle.

Cosine Law of Illumination.—The illuminative intensity of a surface illuminated by only one point source, varies as the cosine of the angle of the rays incident upon the surface from that source.

Cotangent.—A trigonometrical function. The tangent of the complement of an arc or angle.

Coulomb.—The unit of electric quantity accepted for practical use. A quantity of electricity equal to that which would pass in one second through a circuit conveying one ampere. The quantity of electricity which a condenser of one Farad capacity contains when subjected to the E. M. F. of one volt.

Coulomb Meter.—A meter that measures in coulombs the quantity of electricity passing through any circuit.

Counter-Clockwise Motion.—A rotary motion which observed when facing a clock is opposed in its direction to that of the clock's hands.

Counter-Electromotive Force.—An electromotive force tending to send out a current in the opposite direction to that actually emanating from a source. An electromotive force in an electric motor created by the revolution of the armature and opposed to the force generated by the driving current.

Counter-Electromotive Force of Arc.—An electromotive force created while a carbon voltaic arc is forming and opposed to that which sustains the arc.

Counter-Electromotive Force or Electrolysis.—A counter-electromotive force resulting from electrolysis in the plating bath of an electrolytic cell.

Counter-Electromotive Force of Mutual Induction.—A counter-electromotive force created by reciprocal induction between adjacent circuits.

Counter Pressure.—A term occasionally applied to counter-electromotive force.

Cradle Dynamometer.—A dynamometer with a cradle which holds the machine to be tested, and the mechanical energy which it takes in or gives out is measured by the torque which the cradle develops about its axis.

Crater in Positive Carbon.—A cavity in the end of a positive carbon of an arc lamp which appears after the lamp has been running a little while.

Creep of Belt.—A term applied to the slipping of a belt.

Creeping of Voltaic Cell.—The deposit or incrustation due to the efflorescence of salts on the sides of the porous cup of a voltaic cell, or on the binding posts or the walls of the container holding the electrolyte.

Creeping of Belt.—The slipping of a driving belt resulting from the driving pulley traveling faster than the driven pulley.

Creosoting.—A process employed to preserve wood, telegraph poles, etc., by injecting creosote into the pores of the wood.

Crevasse.—A fine split in a magnetized substance used to determine the magnetic forces on a small needle.

Critical Pressure of a Gas or Vapor.—The lowest point of pressure which will not admit of the vaporization of a substance in the fluid state by increase of temperature; but where instead, it changes entirely into gas. The lowest point of pressure where a gaseous substance when cooled, liquefies in the

presence of its vapor. The pressure above which a gaseous substance will not liquefy, however much may be the pressure.

Critical Temperature of a Substance.—A degree of temperature above which a substance, in gaseous form, will not liquefy, however much pressure may be applied. The temperature below which a gaseous substance is subject to liquefaction by pressure, it being a vapor.

Crookes' Effect.—An effect obtained in high vacuum tubes, resulting from motions peculiar to heated or electrified molecules when in high state of radiation.

Crookes' Radiometer.—An apparatus which demonstrates the action of radiant matter in effecting motion from the reactionary effects of a stream of molecules cast off from a number of unequally heated surfaces which are easily moved.

Crookes' Tubes.—Glass tubes, practically total vacuums employed to demonstrate the characteristics of the ultragaseous condition of matter. A term often applied to X-ray tubes.

Cross Bonding.—The bonding, in an electric railroad between the ground feeder and the track employed, in order to secure a good conducting return circuit.

Cross-Connected Dynamo.—A dynamo, which has the ends of its armature coils connected to corresponding segments around the commutator.

Cross Current.—A current which flows between the armatures of alternating current generators worked in parallel, and created by differences in magnitude or phase of the E. M. Fs. in the machines.

Cross, Electric.—Usually a metallic connection occurring between two conducting lines. A fault in any circuit resulting from the crossing contact of two wires.

Cross System.—A system which provides for the running of wires overhead in order to prevent reciprocal inductive perturbation, and which is effected by the crossing or transposition of the wires on the pole arms at desired intervals, in contradistinction to the twist system.

Crow-Foot Zinc.—A zinc like a crow's foot in form and used in the gravity voltaic cell.

Crucible, Electric.—A crucible adapted to electro-metalurgical operations. A crucible in which to effect difficult fusions and secure the separation of metals from their ores or to form alloys, the heat of a voltaic arc or electric incandescence is used.

Crystal.—The regular form which a substance tends to assume in solidifying and displaying a solid body which presents symmetrically arrayed surfaces.

Crystallization.—The process by which a substance in solidifying through solution or fusion, assumes the form of a crystal.

Crystallize.—To take on crystalline form in the separation from the vaporous or liquid condition.

Cryptoscope.—An apparatus fashioned in form of a tube of pasteboard having a florescent screen at one end and which is viewed through an eye-piece at the other end.

Cupric Electrolysis.—Electrolysis effected in electrotherapeutic treatment, by copper electrodes, by which means a salt of copper is conveyed into the tissues under the anode by cataphoric action.

Current Density.—The strength of current which flows in any part of a circuit divided by the cross-section area of that section of the circuit.

Current Distribution.—The branching out of electric currents through a conducting or ramified mass.

Current Efficiency of Storage Battery.—The ratio of the whole useful electric quantity given out to a working circuit by a charged storage battery, to the whole electric quantity used to charge the battery.

Current Electric.—The quantity of electricity, passing through any circuit, per second, the flow being uniform. The rate attained by a quantity of electricity in passing through a circuit. The relation per second considered in reference to electric terms of quantity, between the electro-motive force, which causes the current, and the opposing resistance.

Current Strength.—The quotient, in a direct current circuit of the whole electromotive power, divided by the whole resistance. The time-measure of the flow in a circuit represented by amperes or coulombs per second. The quotient of the whole electromotive power, in an alternating circuit, divided by the resistance.

Current Teaser, Electric.—A coil of fine wire used on the field magnets of an electric dynamo or motor, together with the series coils already wound upon it, and which is connected to serve as a shunt across the main circuit.

Current Transformation.—The changing of the strength of a current by modifying its electro-motive force. The changing of a direct into an alternating current, or vice versa, or the changing of an alternating current of one phase into a current of many phases.

Curve of Sines.—A curve which represents at continuous successive positions the successive values of the sines of a progressively varying angle.

Cut-Out.—To abstract an electro-receptive device from the circuit of an electric source.

Cut-Out Cabinet.—Any enclosure of space in a building arranged for the reception of fuses or cut-outs.

Cutting Lines of Magnetic Force.—The cutting or intersecting of lines of magnetic force or flux by passing a conductor through such lines or by passing such lines through a conductor.

Cycle.—Events following in succession, recurring periodically, the reckoning of periodicity being taken from any moment of interruption to the next moment of occurrence.

Cycle of Alternations.—The cycle of an electro-motive force, current or flux, alternating periodically.

Cyclometer.—An instrument which records the number of revolutions made by a wheel or any other revolving device, or which records the distance covered by its periphery.

Cylindrical Armature.—A name given to a drum armature.

Cylindrical Core.—A mass of iron, cylindrical in form and used for the core of a solenoid or helix. A mass of soft carbon, cylindrical in form and used in cored electrodes.

D.

D. C.—An abbreviation for direct current.

D. P. Switch.—An abbreviation for double pole switch.

Damped Galvanometer.—A galvanometer the needle or coil of which comes to repose almost immediately when moved.

Damped Vibrations.—Vibrations occurring under conditions which enable the swinging or oscillating motion to immediately assume repose instead of continuing the to and fro movement when the force which causes the vibration is removed. Vibrations of successively decreasing amplitude.

Damper.—A metallic cylinder disposed in such manner as to nearly or entirely encompass the iron core of an induction coil for the purpose of effecting a variation in the intensity of currents produced in the secondary. A dash-pot furnished to obviate the too sudden movements of a lever or other member of a moving contrivance.

Damping.—The stopping of sudden oscillations without waiting their cessation after reiterated to and fro movements. The neutralization of the motive energy in a periodically moving body by the application of impeding forces.

Damping Magnet.—Any magnet serving to check the motions of a moving object or magnet.

Dash-Pot.—A cylinder partly filled with fluid having a loosely fitting piston to ease the blow of any falling weight. A contrivance to obviate too sudden motion in the movable members of an apparatus.

Day Load.—A load carried on a machine or at a central station during the day time.

Dead-Beat.—Damped heavily. That motion of a galvanometer needle which describes excited movement from point to point and returns quickly to repose. Aperiodic.

Dead-Beat Galvanometer.—A galvanometer whose needle does not reiterate its to and fro oscillatory motion, but instead, comes quickly to repose.

Dead Ground or Grounding.—A grounding that will secure a ground of negligible resistance.

Deci.—A prefix signifying the one-tenth part.

Deci-Ampere.—A tenth of an ampere.

Deflection of Magnet.—The deviation of a magnetic needle from the true geographical north.

Declinometer.—An instrument for measuring the declination of the magnetic needle.

Decohere.—To re-establish or recover the normal condition of a coherer.

Decomposition, Electrolytic.—The resolution of a molecule into its composite radicals or into its ultimate atoms when subjected to the action of an electric current.

Deflection of Magnetic Needle.—The deviation of a needle from a point of repose either in the earth's magnetic field or in that of another magnet and produced by the influence of the flux of an electric current or of a magnet.

Deka.—A prefix expressing ten times.

Deka-Ampere.—Ten amperes.

Deliquescence.—Liquefying in the air. The solution of

a crystalline body by the attraction of moisture from the atmosphere.

Delivered Power.—The power delivered at one end of a line, in a system of electrical transmission, in contradistinction to the power delivered into the line at the other end.

Delta Current.—In a triphase system the current between contiguous wires. The ring current.

Delta Triphase-System.—A triphase-system with terminal connection similar in appearance to a triangle or the Greek letter Delta.

Demagnetization.—The act or process of depriving a magnet of magnetic polarity.

Demagnetization by Successive Reversals.—The act of abstracting the magnetism from a mass of magnetized metal by exposing it to the action of successive magneto-motive forces, which alternate in direction and are gradually reduced to zero.

Density of Current.—The quantity of current which flows per-unit-of-area of cross section in any section of a circuit.

Density of Field.—The quantity of magnetic flux which flows through any field per-unit-of-area of cross section.

Depolarize.—To deprive of polarity.

Detector Galvanometer.—Any imperfed pattern of galvanometer serving to detect the presence of electric currents.

Diacritical Current.—That strength of a magnetizing current which will magnetize an iron core to a degree equal to one-half saturation.

Diacritical Point of Magnetic Saturation.—A term set

forth for such value of the co-efficient of magnetic saturation that its core is magnetized precisely to one-half of its practicable maximum magnetization.

Diamagnetic.—A property characterizing zinc, antimony, phosphorus, bismuth and other substances by which they appear to be repulsed when put between the poles of strong magnets.

Diameter of Commutation.—The diameter at that part of a dynamo's commutator where the brushes touch. The diameter of the commutator of an open circuited armature which is in direct contact with the collecting brushes.

Diaphragm.—A thin plate or disc of elastic material well secured at its edges and susceptible to vibratory motion. The porous partition of an endosmometer or of a voltaic cell. A plate with a circular opening used in instruments to cut off marginal portions of a beam of light as at the focus of a telescope.

Diaphragm Photometer.—A photometer whose functional operation is dependent upon the equality of the effulgence produced on the two halves of a diaphragm by altering the distances of the light effects from the diaphragm, or by changing the inclination of the bright rays on it.

Dielectric.—Any substance through whose mass electrostatic induction is allowed to occur.

Dielectric Hysteresis.—A kind of molecular friction corresponding to hysteresis occurring in a dielectric under changes of electrostatic stress. A certain property of a dielectric which permits the consumption of energy in reversals of electrification.

Dielectric Hysteretic Impedance.—The apparent component of resistance or obstruction in an alternating current circuit resulting from dielectric hysteresis.

Dielectric Hysteretic Lag.—In an alternating current circuit the lag resulting from dielectric hysteresis.

Difference of Potential.—That property in space relating to quantity, by which work is performed when a mass of matter is shifted from one point to another.

Difference of Magnetic Potential.—That property in space relating to quantity, by which work is performed when a magnetic pole moves in it. The magnetic performance on a unit magnetic pole in a trip between two points.

Difference of Thermal Pressure.—A phase used at times for the variation of temperature existing between two points in a conducting material which is supposed to produce the flow of heat from the higher to the lower temperature, through such conductor.

Differential Compound Motor.—A compound motor wherein the magneto-motive force of the working current operates in opposition to a like force of the shunt excitation in order to keep the speed constant under all loads.

Differential Electric Arc-Lamp.—A term used signifying a derived circuit arc-lamp, the lighting magnet of which consists of a core with series of shunt coils or of two individual cores opposed to each other, one containing the shunt winding and the other the series.

Differential Electro-Magnet.—An electro-magnet differentially wound.

Differential Permeability.—In a substance being subjected to magnetization, the differential co-efficient of flux density to the magnetizing force.

Differential Winding.—A manner of double winding of magnet coils which results in the opposition of the two poles to each other.

Differential Winding of Field.—A manner of field magnet winding resulting in two exciting currents exerting opposing magneto-motive forces. A manner of winding which results in the magnetizing flux of the series coil being opposed by that of the shunt coil.

Differentially Wound Motor.—A motor compound wound wherein the shunt coil current opposes in its magnetizing consequence, the current in the series coil, so that the difference between the magnetizing effects of the two coils is equal to the efficient magnetizing effect produced.

Diffusion of Magnetic Flux.—The lateral deviation of magnetic flux from the direct course between the poles which produce it.

Dimensions of Units.—The exponential values tacitly assigned to units of length, time and mass.

Dimmer.—A choking coil used in an alternating current system of distribution for governing the strength of current flowing through incandescent lamps. Resistance used to reduce the flow of current through incandescent lamps.

Dioptrics.—The science which treats of the laws of the refraction of light.

Dip.—Dip of the needle or magnetic dip. The inclination of the magnetic needle.

Diphase-Alternating Currents.—Two individual alternating electric currents with a phase difference of one-quarter of a cycle. Two-phase currents. Quarter-phase currents.

Diphase Rotary Field.—A magnetic field obtained by the employment of four or more magnet poles wound in such manner as to require their polarity to alternate with changes in the direction of the current, and in addition, to act as though the field rotated. A rotating magnetic field effected by diphase currents.

Diplex Telegraphy.—A method providing for the transmission of two telegraphic messages over a single wire and in the same direction simultaneously.

Diplex Telephony.—A method providing for the transmission of two telephonic messages simultaneously in the same direction and over the same wire.

Dipping.—An electro-metallurgical process in which a metallic salt is dipped in a solution of resolvable metallic salt whereby a light deposit or plating of metal is obtained on its surface. Preparing surfaces for electro-plating by dipping them in certain acid fluids.

Dipping Basket.—A non-corrosive perforated basket used in electro-plating to hold articles which are to be dipped in the cleaning solution.

Dipping Hook.—A metallic hook used in electro-plating to hold the articles which are to be dipped in the cleansing solution.

Dipping Magnetic-Needle.—A magnetic needle so suspended as to be free only in a vertical plane and used to ascertain the magnetic inclination.

Direct-Coupled Dynamo.—A dynamo the shaft of whose armature is coupled directly to the driving shaft.

Direct-Current Dynamo-Electric Machine.—A dynamo-electric machine which has the capacity to supply direct currents.

Direct-Current Electric Motor.—An electric motor which is driven by direct currents in contra-distinction to one driven by alternating currents.

Direct-Current Rotary Transformer.—A term applied to a rotating secondary generator of continuous currents.

Direct Reading Galvanometer.—A galvanometer having the absolute value of the deflection and current strength directly indicated instead of reckoned.

Direction of Electric Current.—An assumption that an electric current leaves its source at its positive pole and re-enters it at its negative pole.

Direction of Lines of Force.—The direction of magnetic flux.

Direction of Magnetic Flux.—An assumption that magnetic flux leaves a magnet at its north-seeking pole and re-enters it at its south-seeking pole.

Disc Armature.—An armature of a dynamo electric machine the windings of which are composed of flat coils maintained on the surface of a disc.

Discharge.—The equalization of differences of potential by connecting them by a conductor. To equalize the difference of potential between the terminals of a condenser by connecting them with a conductor. The abstraction of a charge from a conductor by connecting it to the earth or another conductor. The abstraction of a charge from an insulated con-

ductor by the use of a current of electrified air atoms.

Disconnect.—To break an electric circuit or open it. To abstract an electro-receptive contrivance from a circuit.

Disconnection.—A term used generally to indicate divers faults occasioned by a circuit accidentally breaking or becoming disconnected. The purposely opening or breaking of a circuit or the abstraction from it of an electro-receptive contrivance. An interruption in the continuity of a circuit.

Disintegration of Storage Battery Plate.—The gradual wearing and falling away of the live material of a storage battery plate from the perforations of the grid.

Dissipation Function.—A function signifying the rate at which the passage of an electric current through a conductor produces heat.

Dissipation of Energy.—The scattering, loss or waste of usable energy.

Dissonance, Electric.—Electrical discord. A term applied to alternating electro-motive forces with opposed phases, and signifying the opposite of electric consonance.

Distillation, Electric.—The distilling of a liquid by the employment of electricity which, by electrifying the liquid, assists the effects of the heat.

Distorsion.—The state of being wrested or twisted out of natural shape or position produced in an entity by the action of a stress.

Distorsion of Magnetic Field.—An alteration in the direction and dispensation of the magnetic flux in the field of a dynamo armature, effected by the magneto-motive power of the armature current.

Distributing Board.—A term given to a cross connecting board in a telephonic or telegraphic system. A board which is the terminating point for the wires from a telephone switchboard and where connection with the circuit wires is effected. An insulating board equipped with screw-connecting pieces and serving in a distributing system to connect branch circuits to mains, with or without fuse cut-outs.

Distributing Box.—A box so equipped as to be easily able to change the connections of distributing circuits with the source from which they receive their supply. A box located at a point of distribution and containing the fuses appertaining to that section of the distributing system.

Distributing Mains.—The mains used in a feeder system of parallel conductors.

Distributing Center.—A point of ramification. The center of distribution in a distributing system.

Distribution of Electricity by Commutating Transformers.—A system of distribution employing motor generators whose field magnets and armatures do not revolve as a special commutator is used to change the polarity of the magnetic circuit.

Distribution of Electricity by Means of Transformers.—A system whereby the electric energy is conveyed by means of continuous currents which are transmitted over the line to conveniently located stations at which motor dynamos do duty for transformers.

Distribution of Electricity by Motor Generators.—A system of electric distribution wherein an uninterrupted electric stream of high potentiality, distributed through the main line, is employed at the place where its energy is to be made use of, to drive a motor, which drives a dynamo, the current of which serves to energize the electro-receptive devices.

Diurnal Load-Factor.—The ratio between the whole number of units delivered from a station during twenty-four hours to the number which would have been delivered had the work of the plant been performed under its maximum load during that time.

Divergent Flux.—A flux whose intensity diminishes by divergence or diffusion as it proceeds along its course.

Door-Opener, Electric.—An electro-magnetic contrivance used to open a door from a distance.

Door Push.—A contact, as in a burglar alarm system, which opens or closes by the opening or closing of a door or window and sounds the alarm from a distance.

Double-Armature Windings.—Two armature windings fixed to a core symmetrically, with their respective ends connected to alternate commutator bars.

Double-Balance Relay.—Two relays, in a closed current telegraph alarm system, which are connected in series, one serving to close a local circuit in the event the main line current weakens noticeably, and the other serving to close a local circuit if the main line current should strengthen noticeably.

Double-Break Switch.—A two-pole switch. A switch serving to break a circuit at two points in which it is distinguished from a switch which breaks a circuit at only one place.

Double-Carbon Arc-Lamp.—An arc-lamp provided with two sets of carbon electrodes which enable it to burn all night without being replenished with other carbons; the two sets being so disposed that when one set burns out the current is switched automatically to the other set.

Double-Contact Push.—A push having two contacts and so contrived that pressure upon it opens one contact and closes the other.

Double-Deck Switchboard.—A switchboard having two rows of switches and instruments, one over the other.

Double-Filament Lamp.—An incandescent lamp often used as a side light for a vessel, and supplied with two carbon filaments, adjusted so that in case one should break, the other will continue to burn. An incandescent lamp requiring double the pressure of an ordinary lamp by reason of its having two filaments connected in series.

Double-Pole Cut-Out.—A cut-out which, by a single action, cuts out both the positive and the negative leads. Two safety fuses occupying the same holder and being respectively connected to the positive main and negative main.

Double-Pole Switch.—A switch serving to break the circuit of both the positive and negative leads at the same instant.

Double-Reduction.—A velocity reducer for gear wheels

using two gear wheels and two pinions, or one intermediate shaft.

Double-Reduction Car-Motor.—A car-motor equipped with a double reduction or an intermediate gear shaft between the car wheel and motor shaft.

Double-Throw Switch.—A switch which can be thrown into either one of two contacts. A throw-over switch.

Double-Trolley.—In a double over-head system, two distinct trolleys carried on the same car and running over two distinct wires which make a metallic circuit.

Double-Truck Car.—A car resting on two separate single trucks, a plan adopted for long cars to insure safety and convenience in turning short curves.

Double-Winding of Armature.—An armature winding supplied with two distinct windings or sets of coils, the windings being insulated from each other and connected to the commutator at every other segment, providing thus for the brushes to repose upon corresponding segments, connected with each winding, and thereby allowing each winding to supply one-half the current strength with an accompanying diminution in the inductance of each circuit.

Double-Wire Moulding.—A moulding providing for the accommodation of two wires each in a distinct groove.

Drag of Magnetic Field.—A term applied at times to the torque or electro-dynamic force resulting from the presence of an active conductor in a magnetic field.

Draw-Bar.—The bar which connects a locomotive with its train.

Draw-Bar Pull.—The pull exerted by a locomotive at its draw-bar as discriminated from its motor pull.

Driven Pulley.—A pulley to which the motion is given by a driving shaft.

Driven Shaft.—A shaft operated by a driving pulley belt.

Driving Pulley.—The pulley of a machine located on the driving shaft.

Driving Pulley of Motor.—A pulley mounted on the shaft of a motor or a pulley which conveys the mechanical power of a motor.

Driving Shaft.—A shaft connected immediately with a prime mover.

Drop.—A word signifying the drop of potential, pressure or electro-motive force. The fall of potential occurring in an active conductor, due to its resistance.

Drop Annunciator.—An electro-magnetic annunciator which, when energized, sets free a shutter and allows it to drop.

Drop of Potential.—The decrease of potential equal in any section of a circuit to the product of the resistance and the current strength in that section of the circuit.

Drop of Voltage.—The difference of potential of any section of a circuit.

Drum Armature.—A dynamo armature with coils wound over the exterior part of a drum in the direction of its length.

Dry Battery.—Several distinct dry voltaic cells connected in a manner to act as a single source.

Dry Transformer.—A transformer air-insulated; being thus distinguished from an oil-insulated transformer.

Duct.—A space in a conduit underground for a single wire or cable.

Dummy Moulding.—An ornamental moulding, not intended to receive a wire; but placed on the ceiling to preserve the symmetry of the decorative arrangement which includes the useful mouldings into which wires are laid.

Duplex Cable.—A cable consisting of two separate conductors paralleling each other.

Duplex Telegraphy.—A system providing for the transmission of two telegraphic messages over a single wire simultaneously in opposite directions.

Duplex Transmission.—The transmission of two telegraphic or telephonic messages simultaneously over the same wire in opposite directions.

Duplex Wire.—An insulated conductor having two distinct parallel wires.

Dust Telephone-Transmitter.—A style of microphone transmitter supplied with a carbon dust contained in a conveniently arranged box which is connected with the transmitter's terminals.

Dynamic Electricity.—A term applied to current electricity as distinguished from static electricity.

Dynamics.—That branch of mechanics which treats of the action of forces producing motion in bodies.

Dynamo.—A dynamo electric machine. A generator.

Dynamo Brush-Holder.—Contrivances for holding the collecting brushes of dynamo electric machines.

Dynamo-Electric Machine.—A machine which, by means of electro-dynamic induction, converts mechanical energy into electric energy. A dynamo.

Dynamo or Motor Frame.—The iron frame of a dynamo or motor with the standards and pole pieces included, but not the bearings and base plates.

Dynamo Regulator.—A term applied to a style of rheostat used in regulating a dynamo.

Dynamo Resistance Box.—A style of rheostat used for regulating a dynamo.

Dynamo Terminals.—A dynamo's main terminals.

Dynamometer.—An instrument for measuring force or power.

Dyne.—The C. G. S. unit of force. The force capable of imparting in one second a velocity of one centimeter per second to a mass of one gramme.

E.

E. H. P.—An abbreviation of Electrical horse power.

E. M. F.—An abbreviation of Electro-motive force.

Ear Piece.—A round opening into an air chamber superposing the diaphragm of a telephone receiver and so shaped as to conveniently fit the ear.

Earth.—A defect in any line of electric conduction resulting from accidental contact of such line with the earth or ground. That earth or ground which forms part of an electric circuit.

Earth Circuit.—A circuit, the course of which, is formed partly by the earth or ground. A part of the ground or earth with which an electric circuit has been established.

Earth Connection.—A connection which is formed by a conductor connected to any circuit or apparatus and the ground.

Earthenware Conduit.—A glazed earthenware conduit usually containing many ducts.

Earth-Grounded Wire.—A wire having one of its terminals placed in the ground, the earth thereby forming a part of the circuit.

Earth Plates.—Metallic plates sunk in the ground or in water to which the terminals of earth wires are connected.

Earth Return.—A section of a grounded circuit the conducting course of which is formed by the earth.

Ebonite.—A material composed of india-rubber and sulphur, very hard, highly insulating and possessing specific inductive properties to a high degree.

Economic Coefficient.—The relation between the total delivery of a dynamo and the total electric power actually converted in the machine.

Economic Coefficient of Dynamo-Electric Machine.—The relation of the electric force which a dynamo produces at its terminals to the mechanical power employed to drive it.

Eddy Currents.—Useless currents in the armature, pole pieces and magnetic cores of dynamos or other masses of metal, created by the varying strength of contiguous electric currents, or by their motion through magnetic flux.

Edison Distributing-Box.—A box used in the three wire Edison distribution system.

Edison-Lalande Cell.—A zinc-copper couple having a depolarized coating of copper-oxide on the copper, the couple being immersed in an electrolyte of potash or caustic soda.

Effective Starting-Current of Motor.—The value of the initial current of a motor indicated by an ammeter.

Efficiency.—The relation of a result effected to the expenditure necessary to effect the result.

Efficiency of Conversion of Dynamo.—The whole sum of electric energy produced by a dynamo divided by the sum total of the mechanical energy necessary to drive it.

Efficiency of Electric Lamp.—The relation of the luminous energy given out by an incandescent lamp to the energy which it absorbs. The relation of the number of candles to be had from an electric lamp to its electric activity indicated in watts.

Efficiency of Electric Motor.—The relation of the electric power discharged at a motor pulley to that which is furnished at its terminals.

Efficiency of Transformer or Converter.—The relation of the electric power furnished at a transformer's secondary terminals to that furnished at its primary terminals.

Efflorescence.—A change of crystalline salts to a powder from gradual decomposition upon exposure to air, due to loss of the crystallization water.

Elasticity.—A property inherent in bodies by which they recover their former figure or dimensions upon the removal of external pressure or stress.

Electric.—Pertaining to electricity.

Electrically.—By means of electricity.

Electrician.—A person versed in the science and application of electricity.

Electricity.—A term applied to that unknown power in nature which produces electric phenomena.

Electro-Bath.—The liquid solution used in electro-plating.

Electro-Brassing.—Depositing brass upon a surface by electrolysis or electro-plating.

Electro-Capillary Phenomena.—An electric appearance noticeable in capillary tubes where the surfaces of two liquids come in contact.

Electro-Chemical.—Pertaining to electro-chemistry.

Electro-Chemical Decomposition.—Electrolysis or decomposition by means of electricity.

Electro-Chemist.—A person well versed in the science of electro-chemistry.

Electro-Chemistry.—The department of electric science which treats of combinations and decompositions produced by the electric current.

Electro-Coppering.—Coating a surface with copper by the electro-plating process.

Electro-Deposit.—A layer of metal deposited upon an article by electro-plating.

Electro-Deposition.—The act of coating with metal by electrolysis.

Electro-Dynamic Machinery.—Any machinery serving to produce, transmit, measure or use energy by means of electricity.

Electro-Dynamic Motor.—An electric motor or one operated by means of electro-dynamic force.

Electro-Dynamic Rotation.—Rotation produced by electro-dynamic force.

Electro-Dynamics.—The branch of electric science treating of the action upon one another of electric currents, or their action upon themselves or upon magnets.

Electro-Etching.—A term applied to engraving by electricity.

Electro-Extraction of Ores.—Divers processes by which metals are electrically extracted from ores.

Electro-Kinetic Energy.—Electrical energy in actual performance of work.

Electro-Kinetics.—A term given to the appearances of electricity in motion or currents of electricity; in contrast to electrostatics or of the appearances of electric charges or electricity in repose.

Electro-Magnet.—A magnet obtained by the flow of an electric current through an insulated wire circuit. A coil possessing magnetizing power encompassing a soft iron core which is susceptible to instant magnetization or demagnetization when the circuit is opened or closed.

Electro-Magnetic Ammeter.—A style of ammeter whose needle is moved in opposition to the field of an electro-magnet by the field of the current it is measuring.

Electro-Magnetic Attraction.—The reciprocal attraction of the unlike poles of electro-magnets.

Electro-Magnetic Bell.—A bell set in motion electromagnetically.

Electro-Magnetic Brake.—A car-wheel brake either deriving its power from electro-magnetism, or which is operated by electro-magnetic contrivances.

Electro-Magnetic Cut-Out.—A cut-out which acts by the use of an electro-magnet.

Electro-Magnetic Field.—That field which either an electric current or an electro-magnet produces.

Electro-Magnetic Flux.—Magnetic flux created by an electric current or electro-magnetism.

Electro-Magnetic Helix.—An electro-magnetic solenoid.

Electro-Magnetic Induction.—A kind of electro-dynamic induction wherein by the motion, either of electro-magnets or electro-magnetic solenoids, electric currents are obtained.

Electro-Magnetic Inertia.—A term applied to the self-inductance of a current.

Electro-Magnetic Rotation.—Rotation resulting from electro-magnetic attractions and repulsions, as in a motor.

Electro-Magnetic Separator.—A contrivance by which the dross is separated from the ore of finely powdered low-grade iron ores. A contrivance providing for the elimination of particles of iron from non-magnetic filings by magnetic attraction.

Electro-Magnetic Solenoid.—A coil of wire, cylindrical in form, each of its convolutions being circular. An electro-magnetic helix.

Electro-Magnetic Temperature-Regulator.—An instrument for registering temperature electro-magnetically. A regulator of temperature whose performance is contingent upon the operation of an electro-magnet, whose action is excited by the expansion or contraction of a solid or fluid.

Electro-Magnetism.—Magnetism created by electric currents.

Electro-Mechanical Bell.—A bell moved to action by the force exerted upon its striking mechanism by an electro-magnet.

Electro-Mechanical Gong.—A gong whose operation depends upon the action, at times, of an electric current upon its striking mechanism; the blow being struck by mechanical force.

Electro-Metallurgical Galvanization.—A process for depositing a light metallic coating by electrolytic deposition upon the surface of any conductor, such as, for instance: the carbon electrodes employed in arc lamps.

Electro-Metallurgy.—The department of electric science which pertains to the reduction or treatment of metals by electricity.

Electro-Percussion Drill.—A drill used in mining or excavating rock and which operates with a reciprocal motion produced by the flow of an alternating electric current through one or the other of two solenoids, of which the drill stock is the core.

Electro-Photometer.—An instrument which measures the intensity of light by the application of electricity.

Electro-Plating.—A process for coating conducting surfaces with a metallic deposit by means of an electric current.

Electro-Plating Bath.—A tank holding a metallic solution into which articles to be electro-plated are immersed.

Electro-Fyrometer.—An apparatus used to ascertain the degrees of temperature by measuring the re-

sistance of a platinum wire which has been subjected to the action of the temperature to be determined.

Electro-Siliceous Light.—A brilliant incandescence obtained in a glass tube by the discharge through it of a powerful static machine; the tube being crossed by a platinum wire and immersed in salt water, resulting in the melting and volatilization of the wire by the intense heat of the discharge.

Electro-Smelting.—The separation of metals from the ores by means of electrically generated heat, i. e.: heat generated by electric currents.

Electro-Therapeutics.—The use of electricity in the treatment of the human body for disease.

Electro-Thermic.—Pertaining to the application of electricity for generating heat.

Electro-Tinning.—The electro-plating or coating of a substance with tin.

Electro-Type.—The electrolytic deposition of metals in a mould in order to obtain a fac-simile.

Electro-Type.—The impression of type produced by the electro-metallurgic process.

Electro-Type Process.—The process by which an impression or cast of type is produced by means of electro-metallurgy.

Electrocution.—Execution of the death penalty by means of an electric shock.

Electrode.—The one or the other of electric source terminals which is put into a solution where electrolysis is going on. One or the other of the electrotherapeutic terminals of an electric source.

Electrolier.—A fixture serving to hold electric lamps as distinguished from one designed for gas burners.

Electrolier Cut-Out.—A cut-out employed in the circuit of an electrolier.

Electrolier Switch.—A switch serving to light and extinguish lamps in an electrolier.

Electrolysis.—The process of chemical decomposition by the action of an electric current. The dissolution of the molecule of an electrically decomposable compound into its radicals.

Electrolyte.—A compound decomposable or subjected to decomposition by an electric current.

Electrolytic Assaying.—Assaying by aid of electrolysis.

Electrolytic Corrosion.—The corrosion of metallic pipes or other metallic material buried in the ground resulting from electrolytic action.

Electrolytic Decomposition.—The dividing of a molecule into its component ions or radicals by means of an electric current.

Electrolyze.—To electrically separate or decompose.

Electrometer Fatigue.—The elastic exhaustion of an electrometer's needle suspension resulting in its failure to return to the zero point.

Electromotive Force.—The cause which produces currents of electricity. Potential difference causing a current to flow.

Electromotograph.—An apparatus having a rotating cylinder of chalk moistened with a solution of caustic soda and a diaphragm with an arm pointed with platinum, connected to its center and pressed against the surface of the cylinder by a spring,

the point being reduced by electrolytic action incident to the flow of the electric current.

Electromotographic Telephone.—A telephone for loud speaking and operated on the electromotographic principle.

Electron.—A word signifying amber, not obsolete, but seldom used. An alloy of gold and silver. The throwing of electric particles from the cathode of a high vacuum tube.

Electropoion Liquid.—A depolarizing solution consisting of one part of bichromate of potash dissolved in ten parts of water, with two parts of sulphuric acid added gradually.

Electroscope.—An apparatus for indicating the presence of an electric charge, and for determining its character, as to the positive or negative state of the charge, without measuring its amount of value.

Electrostatic Discharge.—A term used to express a disruptive discharge.

Electrostatic Generator.—A term used in general application to divers forms of influence machines.

Electrostatic Induction-Machine.—A machine from the initial charge of which proceeds a charge greatly increased by its inductive action on a plate of glass or other dielectric, rapidly rotated.

Electrum.—An alloy of gold and silver and other substances of an amber color used by the ancients and which were susceptible to electrification by friction.

Element.—One of the ultimate, indecomposable constituents of any kind of matter.

Element of Storage Battery.—One set only of positive and negative plates of a storage cell connected in

such manner as to be prepared to be put into the containing jar of acid liquid.

Elevator Annunciator.—An annunciator in an elevator connected with the different floors from which signals are received.

Elevator, Electric.—An elevator whose motive power is derived from electricity.

Elevator Switch.—A switch located in an elevator and serving to control the working of the elevator motor.

Elliptical Rotary-Magnetization.—The magnetization manifested in a diphas motor where two alternating magnetic currents exist at the same time, each one out of phase with the other.

Emergency Brake.—A brake adjusted to any vehicle to be used in an emergency only. A brake used in electrical vehicles in cases of emergency only; possessing more than ordinary power and serving as a reversing switch to immediately reverse the rotating direction of the motor.

Emergency Crew.—A gang of men attached to a power distribution system and assigned to emergency duty, consisting of prompt attention and restoration in cases of break down or other irregularities.

Emergency Switch.—An auxiliary switch used on a car controller to reverse the motion of a car when required.

Emmetropic Eye.—The human eye in its normal condition.

Enamelled Rheostat.—A rheostat the wire coils of which are deposited in a quantity of enamel.

Enclosed Arc-Lamp.—A lamp with a closely fitting globe which encloses the carbon so as to secure around the arc an atmosphere with practically no oxygen, by reason of which the rate of consumption of the carbon is decreased.

Enclosure of Magnetic Flux.—Enclosing magnetic flux in a ferric magnetic circuit. The linkage of the flux.

Endlessness.—The state of a closed ring and of uniform cross section, magnetizing coils being uniformly wound around it, thereby securing throughout the length of the ring a practically uniform magnetic field.

Endosmose.—The unequal blending of two different fluids in the penetration of any intervening porous structure.

Endosmose, Electric.—The unequal blending of two liquids through the pores of a partition, separating cells; where an electric current is made to pass through the partition or septum.

Energy.—Power efficiently and forcibly exerted.

Energy Efficiency of Storage Battery.—The Watt-hour efficiency.

Energy, Electric.—Power efficiently exerted by electricity in the performance of work.

Energy Meter.—A name given to a Watt-meter.

Energy of Motion.—A term applied to kinetic energy.

Engine-Room Tachometer.—A tachometer designed for use in connection with engines, dynamos and rotating machinery generally in engine rooms.

English Heat Unit.—The British unit of heat. The heat required to raise one pound of water 1 degree F.

Entrefer.—The opening of non-magnetic substance through which the field flux must pass in a dynamo-electric machine's surface, formed of air or composed of an air gap. The breadth of the non-magnetic gap in distinction from a smooth-cored armature's simple air gap.

Equalizer.—A term applied to an equalizer wire. A device by use of which electric pressure over a system is equalized. An equalizing bar.

Equalizer Wire.—An equalizing bar. A wire by which the series windings of several compound-wound generators are operated in parallel.

Equalizing Bar.—A bar uniting the series coils of two compound-wound generators connected in parallel, thus providing that a surplus of current furnished by the armature of one machine will of necessity excite the other machine to a like degree.

Equator of Magnet.—A point nearly half way between the poles of a straight bar magnet or approximately half way from the poles of a horseshoe magnet if measured from each pole along the bar. The neutral point line on a magnet.

Equilibrium.—A state of rest produced by the mutual counter-action of two or more forces.

Equipotential.—Pertaining to an equality of potential.

Equipotential Magnetic-Surfaces.—Surfaces which surround the poles of a system of magnets or one magnet at which the magnetic potential is the same.

Equivalent Air-Gap.—An air gap which would possess magnetic resistance equal to that of a joint, supposing the penetrability of the metal not to be affected by cutting.

Erg.—The absolute C. G. S. unit of work or energy. The work done or energy expended in moving a body through one centimeter or against a resistance of one dyne in one second.

Erg-Meter.—An instrument for measuring in ergs the performance of an electric current.

Ether.—A hypothesis of a highly attenuated electric fluid in universal space, the transverse vibrations of which transmit light, electro-magnetic and heat radiation.

Ether Flow Vortices.—Hypothetical vortices in ether, whose supposed existence furnishes a basis upon which magnetic phenomena are explained.

Evaporation.—The act or process of solids or fluids turning into or passing off in vapor.

Evaporation, Electric.—The superficial sublimation or evaporation of a substance under the influence of negative electricity.

Excitation.—The generation of electricity or production of magnetism by any method. The energizing of an electro or magneto-receptive contrivance.

Exciter Dynamo.—One dynamo employed for the excitation of another.

Exciter of Field.—A generator used for exciting the field magnet of a dynamo.

Exhaust Fan, Electric.—An exhaust fan operated by electricity.

Exhaust Wheel, Electric.—An exhaust wheel operated by electricity and serving to exhaust the air from an apartment.

Exhausted Storage Cell.—A storage cell which has been emptied.

Expansion.—The act of expanding or spreading out.
The act of increasing in volume, length or surface.

Expansion, Electric.—The increase in volume of a condenser when charged electrostatically.

Expansion Joint.—A joint adaptable to pipes or tubes which are exposed to changes of temperature and which is equipped with a sliding joint to provide for expansion and contraction.

Expended Energy.—The energy consumed in obtaining a result.

Extension Call-Bell.—A bell connected with a telephone call bell and located in another part of a building and serving to summon a subscriber to the telephone from a remote part of the building.

Extension Push Button.—A push button located at a distance from the main push button.

External Armature Generator.—A generator whose armature is outside of the field frame.

External Magnetic Circuit.—The section of a magnetic circuit lying outside the magnetic source. That part of a magnetic circuit lying outside of its core.

External Magnetic Field.—That part of a magnetic field lying outside of a magnet's body.

Extra-High-Potential System.—A potential over 3,000 volts, in the National Electric Code.

Extraneous Field.—A leakage of magnetic field.

F.

Factor.—One of the elements or quantities which multiplied together form a product.

Factor of Safety.—The relation of the reckoned or measured strength of a structure to the maximum strength it will be required to exert.

Fahrenheit Thermometric Scale.—The division of the thermometer scale into 180 equal degrees, along the length of the tube, between the melting point of ice and the boiling point of water.

Fall-Back Indicator.—A name given to a drop indicator.

Fall of Potential.—Potential drop.

False Zero.—A zero of an instrument used for measuring, the zero being taken at the position it assumes naturally under the influence of other forces than those impressed in the measurement.

Fan Motor.—An electric motor used for operating a fan.

Farad.—The practical unit of electric capacity. That capacity possessed by a conductor which is capable of holding one coulomb of electricity at one volt potential.

Faraday's Cube.—A room insulated and lined with tin-foil which makes no electrical indications on the most delicate instruments on the inside of the room when the room has been charged on the outside.

Faradic Adapter.—A contrivance by means of which ordinary incandescent light circuits can be used in electro-therapeutics, with an induction coil.

Faradic Coil.—A name given to a medical induction coil or faradic machine.

Faradic Current.—A term employed in medical electricity for the induced or secondary alternating current produced by comparatively high electromotive force.

Faradic Machine.—A machine serving to produce faradic currents.

Fathom.—A measure of length containing six feet.

Fault.—A defect in the efficient operation of a circuit caused by ground and cross contacts or disconnections.

Fault Resistance.—That resistance which is due to a fault.

Feed.—To furnish an electric current. To regulate the carbon electrodes in arc lamps.

Feeder.—A conducting wire through which the current flows for distribution to the main conductors, thus differing from a conductor which serves to supply translating devices directly.

Feeder Ammeter.—An ammeter located in the circuit of a feeder generally at a switchboard.

Feeder Block.—A block having a feeder cut-out.

Feeder Box.—A box used for distribution and into which a feeder has been run to receive the distributing connections.

Feeder-Mechanism for Arc-Lamp.—The mechanism used to feed an arc lamp.

Feeders.—Wires which furnish the main conductors with currents at different points whereby their potential under load is equalized, hence differing from wires which furnish the currents directly.

Feeding Device or Mechanism for Electric Arc-Lamps.
—A contrivance which keeps the carbon electrodes

of an arc lamp separated by a regular distance during the time they are being consumed.

Fender.—A form of pilot employed on the front of street cars to guard against accidental injury to persons crossing in front of a moving car.

Ferric Inductance Coil.—An inductance coil having an iron core.

Ferric Magnetic Circuit.—A magnetic circuit consisting of iron entirely.

Ferro-Magnetism.—Magnetism which iron and other paramagnetic substances possess.

Ferro-Manganese Alloys.—Divers alloys used for the wires of resistance coils, the electric resistance of which is not noticeably influenced by changes of temperature.

Field.—A term signifying a magnetic and an electrostatic field.

Field Coils.—The field-magnet coils of a motor or dynamo-electric machine.

Field Frequency.—The frequency of rotation in a revolving magnetic field.

Field Magnetic Coils.—Magnetizing coils on the field magnets of a motor or dynamo.

Field Magnets.—Magnets, generally electro-magnets, used to produce the field in a dynamo or motor.

Field-Regulating Box.—A resistance box.

Field Rheostat.—A field regulating box.

Field Strength.—The intensity of the magnetic force of a field.

Filament.—A fine thread or fiber.

Filament of Incandescent Lamp.—The conductor of an incandescent lamp which becomes incandescent.

Film.—A term used to describe a thin layer or deposit obtained by electro-plating.

Filtration.—The elimination of undissolved solids from the liquid in which they are mechanically suspended.

Fire-Alarm Annunciator.—An annunciator employed in fire alarm systems.

Fire-Alarm Signal Box.—A signal box located in the street or other convenient place from which alarms of fire are sent.

Fire-Alarm Telegraph.—A term applied to the whole apparatus used in fire-alarm telegraphy.

Fish Plate.—The plates used with bolts to connect the track rails on railroads.

Fished Wires.—Wires which have been put into ducts by means of the fishing process.

Flashing Box.—A term at times applied to a junction box.

Fishing Wires.—The process by which a wire is drawn into its place through the walls, ceiling or floors of a building and which is accomplished by inserting the wire into a hole at one point and hooking it from another and then drawing it through.

Fiske's Electric Range Finder.—A device employed to obtain the distance of an object from the point of observation, and signally useful in locating the exact distances of targets or an enemy's ship at sea.

Five-Wire System.—A system resembling the three-wire system in its construction, wherein four series connected dynamos are connected to five conductors.

Fixed Resistance.—A resistance having a nearly con-

stant value, thus differing from a regulable resistance.

Fixture Electric.—Fixtures for electric lights. A fixture for the accommodation of one or more incandescent lamps firmly attached to wall or ceiling.

Fixture Wire.—A style of insulated wire used in electric fixtures.

Flag Signaling.—A system of semaphore signaling consisting of the waving of a light flag upon the Morse alphabetical system, the dots being represented by movements of the flag to the right and the dashes by movements to the left.

Flaming of Carbon Arc.—An irregularity in the burning of a voltaic arc which manifests itself when the carbons are too far from each other and the strength of current is greater than the normal.

Flashed Carbon Filaments.—Carbon filaments which have been improved by means of the flashing process.

Flashing of Dynamo-Electric Machine.—A name for the phenomena of long flashes and sparks at the commutator of a dynamo resulting from the short circuiting of the external circuit at commutator.

Flashing Process for Carbon Filaments.—A process of treatment for the filaments of incandescent lamps whereby improvement is made by the deposit of carbon in the pores and over the surfaces of the filaments, which is accomplished by subjecting the filaments to an incandescence, while surrounded by a carbonaceous fluid.

Flat Commutator-Segment.—A commutator segment whose surface has become flat from burning or wearing away.

Flat-Iron, Electric.—A flat-iron heated by electricity.

Flexible.—Capable of easily bending.

Flexible Cable.—A cable which can be easily bent or flexed.

Flexible Conduit System.—A system of conduits so devised that the conductors which the conduits are to contain can be introduced at any time after completion.

Flexible Electric-Light Pendant.—An incandescent lamp pendant composed of a pair of conductors insulated from each other and flexible.

Flexible Lamp-Cord.—A flexible cord serving to hold an incandescent lamp. A flexible cord having a connection with an incandescent lamp, to some extent portable.

Flow.—The volume of a current or stream of any fluid escaping from an opening in a given time. The volume of fluid passing by a certain point in a given time.

Flow of Energy.—The passage of energy through the medium by which a conductor is surrounded and now accepted as the cause of the electrical current, which was formerly supposed to flow through the conductor.

Flow of Magnetic Flux.—The amount of magnetic flux which flows through a magnetic circuit under a certain magneto-motive force in opposition to a certain magnetic reluctance.

Fluctuating Electromotive Force or Current.—An electromotive force which periodically undergoes variations of magnitude.

Fluidity.—Having fluid properties.

Fluorescence.—That property by virtue of which certain solids and fluids become luminous under the influence of radiant energy.

Fluorescent Screen.—A screen bearing fluorescent materials on its surface.

Fluoroscopic Examination.—An examination of a body by means of an X-ray and a fluorescent screen.

Fluoroscopic Screen.—A screen overspread with fluorescent material and employed for fluoroscopic examination in connection with X-rays.

Flush Box.—An iron box, covered with a heavy hand plate and laid flush or even with the surface and employed in systems of conduits, to make connections therewith and to examine the leakage of conductors, or for like purposes.

Flush Key-Switch.—A key switch which is flush or even with the wall in which it is located.

Flush Switch.—A switch imbedded in the wall in such manner as to leave its outer surface even or flush with the surface of the wall.

Flux.—Magnetic induction; the number of lines of force which pass through a magnetic circuit.

Flux Density.—The intensity of magnetization expressed in lines of force per unit of area of cross-section in a plane at right angles to the lines of force.

Focal Length.—The distance between a focus and lens. The distance from the optical center of a lens where parallel rays come to a focus.

Focus.—A point in which the rays of light meet after being reflected or refracted; as the focus of a lens or mirror.

Focusing.—Modifying the distance between an object and a lens or mirror for the purpose of producing a clean-cut image of the object.

Focusing Arc-Lamp.—An arc lamp used with a reflector or lens and so constructed that its mechanism feeds both carbons in such a manner as to keep the arc at the focus of the reflector.

Foot-Pound.—A unit of work. The work necessary to raise a pound vertically the distance of a foot.

Foot-Pound-Per-Second.—A rate of performance equal to one foot pound expended per second.

Force.—Any action between two bodies which changes or tends to change their relative conditions as to rest or motion.

Force Pump.—A pump having a solid piston and serving to raise liquids vertically to a greater height than they could be raised by atmospheric pressure.

Fork for Trolley Wheel.—A device by means of which the trolley wheel and pole are connected.

Formed Armature-Windings.—Coils of an armature that are wound first on a form and then placed on the armature core.

Formers.—The forms used in producing formed armatures and like windings.

Forming Storage-Battery Plates.—Causing heavy deposits of peroxide of lead and spongy lead respectively on the lead plates of a storage battery, by passing a charging current between them alternately in opposite directions while they are immersed in dilute sulphuric acid.

Formulae.—A rule or principle expressed in algebraic language.

Forward Lead of Dynamo Brushes.—The displacement of the brushes on a dynamo's commutator in the direction in which the armature rotates.

Foucault Currents.—A term expressive of eddy currents, particularly when in armature cores. Useless currents created in a conducting mass by the movement through magnetic flux.

Fountain, Electric.—A fountain worked by electric motors and equipped with a number of jets which when electrically illuminated display lights of different colors.

Fountain Projector.—An arc light projector by means of which the jets of an electric fountain are illuminated.

Four-Point Switch.—A switch capable of having its circuit completed through four points, either one at a time or simultaneously. A four-pole switch.

Four-Pole Dynamo-Electric Machine.—A dynamo-electric machine the magnet field of which is produced by four magnet poles.

Four-Speed Regulator.—A regulator having a motor capable of giving four different speeds.

Four-Wire System.—A system resembling in its general order of form the three-wire system, which provides for the connection of three dynamos to four wires or conductors.

Fractional Distillation.—The evaporation of liquids by heat, providing for the separation of two or more liquids by first obtaining the degree of heat at which the most volatile liquid will boil, and when it has been evaporated the degree of temperature is raised sufficiently to evaporate the next

most volatile liquid, and so on in order until all are evaporated. The separation of liquids by distillation in their successive order of increased temperature required for volatilization.

Fractional Electrolysis.—The electrolysis of various substances by successively raising the E. M. F.

Franklinic Currents.—Currents created by a frictional induction machine.

Free Ether.—A name given to the ether which fills inter-planetary space in distinction from the inter-atomic or inter-molecular ether.

Free Vibrations.—Vibrations in a body susceptible of elastic vibration produced by the vibration of a neighboring vibrating body.

Freezing.—To become congealed by cold; to become changed from a liquid to a solid state by the abstraction of heat.

Freezing Mixtures.—Mixtures composed of such materials as salt and ice, which melt rapidly when mixed, thereby absorbing the heat from surrounding or contiguous substances.

Freezing Point.—The point at which liquids congeal.

Frequency of Alternation.—The periodicity. The number of cycles accomplished in a unit of time by an alternating current.

Friable.—Readily reduced to powder, pulverized or crumbled.

Friction.—The effect of rubbing. The resistance which a moving body meets with by the contact of another body.

Friction Brake.—A form of brake which accomplishes the result by friction.

Frictional Torque.—The torque in a motor which is required to be exerted on the armature in order to neutralize the friction. Torque produced by friction.

Frog.—A triangular crossing support and guide for the wheels of a car where one track branches off from another or crosses it at an angle greater or less than a right angle, and which permits a car or train to leave one track and enter upon another.

Frying of Arc.—A hissing noise resembling the sound of frying noticeable in voltaic arcs when carbons are too close together.

Full Load.—A complete load. The greatest load which a machine is intended to permanently carry.

Full-Load Efficiency of Motor.—A motor's efficiency when working under full load.

Full-Load Efficiency of Transformer.—A transformer's efficiency or the relation of the power rendered at secondary terminals to that which is taken in at primary terminals, when working under full load.

Fulminate.—A term applied to explosives of high explosive properties.

Fundamental Units.—Units of dimension, mass and time to which all quantities are referred, and which are distinct from derived units.

Furnace, Electric.—A furnace in which the heat, electrically generated, is used to produce difficult fusions whereby metals are separated from the ores, and also for the prosecution of other metallurgical operations.

Fuse Block.—A block having a safety fuse.

Fuse Board.—A board made of an incombustible

material, usually slate, upon which a number of safety fuses are mounted.

Fuse Box.—An incombustible box containing a safety fuse or fuse wires.

Fuse Links.—Links composed of strips or plates of fusible metal, serving as safety fuses.

Fuse Panel.—A panel in a switchboard designed to support the safety fuses.

Fusible Plug.—A name sometimes used for a safety plug.

Fusing Current.—A term signifying the quantity of current which causes the blowing or melting of a fuse.

G

Galvanic Adapter.—An apparatus by means of which feeble continuous currents are obtained from an electric light circuit for use usually in electrotherapeutic treatment.

Galvanic Battery.—A term, now misapplied, but sometimes used to signify a voltaic battery.

Galvanic Electricity.—A term, now misapplied, but sometimes used to signify voltaic electricity.

Galvanic Multiplier.—A term practically obsolete, once applied to a galvano-meter.

Galvanic Taste.—A taste resulting from the passage through the tongue of a voltaic current.

Galvanized.—Subjected to galvanic action. The coating of a metal with zinc by cleaning and immersing in melted zinc.

Galvanized Iron.—Iron covered with a coating of zinc.

Galvanized Iron Wire.—An iron wire zinc coated.

Galvanizing.—Coating iron with a layer of zinc by immersion in the melted metal. Subjecting the nerves or muscles of the human body to galvanic influences.

Galvanometer.—An instrument for measuring electric current strength by the deflection of an electric needle.

Galvano-Plastic Matrix.—A mould serving for the reception of a galvano-plastic deposit.

Galvano-Plastics.—A term applied to electrotyping, or the process by which is obtained electrolytic deposits of such sufficient body upon any suitable object as to permit of its convenient separation therefrom.

Galvanoscope.—A crude instrument of the galvanometer type, employed for ascertaining whether or not a current is flowing.

Gap Wire Gauge.—A style of gauge for measuring wires, having a metallic plate that contains gaps or sets of gaps which may be bridged or filled by the wire to be measured.

Gas Engine.—An engine deriving its motive power from heat generated by burning or exploding gas.

Gas-Jet Photometer.—A photometer in which a burning gas jet represents the standard of light and which burns with or without a diaphragm at a definite height and under standard conditions of pressure and volume.

Gas-Lighting, Electric.—The ignition of a gas jet from a distance by electricity.

Gassing.—The development of gas from secondary or storage battery plates.

Gauze Brushes for Dynamo or Motor.—Collecting or commutator brushes for a dynamo composed of wire gauze compressed into suitable shape.

Gearless Car Motor.—A motor the speed capacity of which allows it to be directly connected on the car wheel axle without interjacent gearing.

Geissler Mercurial Pump.—A mercurial air pump which exhausts by the Torricellian vacuum principle.

Geissler Tubes.—Sealed tubes of glass containing highly rarefied gases, either with or without fluorescent liquids or solids or both, and provided with platinum electrodes passing through and fused into the glass, luminous effects being produced on the passage of the electric discharges.

Generator.—A dynamo-electric machine.

Generator Ammeter.—An ammeter designed to measure the total current sent out by a generator.

Generator Bus-Bars.—The copper conductors used in electric lighting or power stations to receive the current from all the dynamos.

Generator Panels of Switchboard.—The panels of a central station switchboard upon which the generator bus-bars are mounted and which maintain the switches, generator ammeters and volt-meters.

Generator Switch.—A switch serving to connect or disconnect a generator from the bus-bars.

Generator Voltmeter.—A voltmeter serving to measure the pressure of the generator with whose circuit it is connected.

Geographical Equator.—The great imaginary line encircling the earth midway between the poles.

Geographical Meridian.—Any great imaginary line encircling the earth in the direction of and passing through the poles and cutting the equator at right angles.

German-Silver Alloy.—An alloy composed of copper $\frac{1}{2}$, zinc $\frac{1}{4}$, nickel $\frac{1}{4}$ and used for wires of resistance coils.

Girder Armature.—An armature whose core in shape resembles a girder or H.

Glass Fuse.—A fuse confined in a tube of glass with metallic ends.

Globe Net for Arc Lamp.—A light wire netting sometimes used on the outside of arc light globes.

Glow Lamp, Electric.—A lamp in which the light is obtained by glow illumination. Another term applied to electric incandescent lamps.

Gold Bath.—An electrolyzable solution of gold salt used for depositing the metal in the electro-plating process; a gold plate, which acts as the anode, being immersed in the liquid opposite the article to be plated, and which article acts as the cathode.

Gold-Leaf Electroscope.—An electroscope consisting of two leaves of gold enclosed in a glass vessel and hung in contact with each other from the end of a conductor, and which diverge when excited, thus serving to detect the presence of an electric charge, or to determine whether it is positive or negative.

Good Earth.—Solid earth connection. Total earth connection. A fault when a conductor is fully connected to earth or grounded at some intermediate point.

Governor, Electric.—A device serving to control the speed of steam engines and electric motors, or to govern the resistance of an electric circuit, the flow of fluids into or out of their reservoirs, the direction of a current in a plating bath, and to perform other like functions.

Gradient.—The rate of ascent or descent by regular degrees of inclination or quantity as referred to some fixed point or quantity.

Gramme.—A unit of weight equivalent to the weight of one cubic centimeter of pure water at its maximum density at a temperature of 39.2 degrees Fahrenheit, in a vacuum. A unit equal to 15.43235 grains troy or avoirdupois weight.

Gramme Armature Winding.—A winding taking its name after Gramme, who first used it on the armature of a dynamo-electric machine.

Gramme-Calorie.—The quantity of heat which is necessary to raise a gramme of water one degree centigrade.

Gramme-Ring Transformer.—A transformer the primary and secondary coils of which are placed on closed rings.

Gramophone.—An instrument which records and reproduces articulate speech.

Gramophone Record.—A record of speech secured by means of a gramophone.

Granular-Carbon Telephone-Transmitter.—A telephone transmitter in which carbon dust is employed.

Graphite.—A condition of carbon distinguished by its softness and metallic luster, and serving to write on paper and other suitable material surfaces.

Graphophone.—See Gramophone.

Graphophone Record.—See gramophone record.

Grappling.—Recovering a sunken cable or other object with a grapnel.

Grapnel.—A device serving to recover a sunken cable or other object.

Gravitation.—The attraction or force by means of which all bodies or particles of matter in the universe tend towards each other.

Gravity.—The force which causes the tendency of masses or particles of matter toward a center of attraction or towards one another.

Gravity-Drop Annunciator.—An annunciator whose signals act by the fall of a drop released electrically.

Gravity-Feed Arc-Lamp.—An arc lamp whose upper or positive carbon is held by a feeding mechanism which drops it towards the negative carbon by the force of gravity.

Grease-Spot Photometer.—A photometer whose disc is a piece of paper upon whose center a spot is saturated with melted paraffine. A Bunsen disc photometer.

Ground.—A term applied to the earth when used as a return circuit.

Ground Circuit.—A circuit in which the earth acts as a part of the course through which the current passes.

Ground Detector.—An instrument employed in a central station for indicating, by the brilliancy of a lamp, the presence of a ground in a system of incandescent lamp distribution.

Ground Indicator.—An instrument which instantly indicates any defect in the insulation on a line. A detector for discovering any loss of insulation.

Ground-Return.—A term used generally signifying the use of the ground as part of an electric circuit.

Grounded Dynamo.—A dynamo the circuit of which has been grounded purposely or by accident.

Grounding.—A term given in electro-metallurgy to the preparatory operation in the process of burnishing. The connecting of a circuit with the ground.

Gutta-Percha.—A concrete juice produced by various tropical trees and much valued in electrical work for its high properties of insulation and great resistance to the destructive agencies when used in submerged or submarine cables.

Guy.—A rope, rod, chain or wire attached to anything to steady and support it, as for instance: a smoke stack, telegraph pole and similar structures.

Guy Rods.—Metallic rods serving as guys.

Guy Wire.—A wire serving as a guy.

Gyration.—The act of turning or whirling around a fixed center.

Gyrostat.—A fly wheel whose revolving motion is gyrostatic. A fly wheel having a considerable movement of mass, properly mounted upon pivots within a case and readily transportable, for the purpose of indicating the resistance offered by rotating bodies to changing their plane of rotation.

Gyrostatic Action of Dynamo on Ship-Board.—The action which takes place at the bearings of a dynamo in operation on a rolling vessel at sea, resulting in gyrostatic stresses.

H

H. P.—An abbreviation for horse power.

H-Armature Core.—An armature having a core resembling in shape the letter H. An I-armature, girder or shuttle.

Half-Load Efficiency.—The efficiency possessed by a device when working under half load.

Half-Shade for Incandescent Lamp.—A reflecting shade conforming in outline to the lamp chamber, but covering only one-half of it.

Hand Generator.—A dynamo or a telephone magneto-generator driven by hand.

Hand-Hole of Conduit.—A box or aperture large enough to admit the hand and providing for access to the cable under ground, thus readily permitting the cable to be tapped.

Hand Regulation.—Regulation of a dynamo accomplished by the hand, as distinguished from regulation automatically effected, and which maintains constant, either the current or the potential.

Hand Regulator.—A resistance box the separate coils of which are easily set within or removed from the circuit by hand.

Hand Telephone.—A telephone receiver used by holding it in the hand as distinguished from one adjusted to the head.

Hanger Board.—A board serving to facilitate the removing or replacing of an arc lamp from a circuit.

Hard-Drawn Copper Wire.—Copper wire, hardened without annealing by being drawn several times.

Hard Porus Cell.—A hard-burned porus cell, which used in a voltaic cell obtains a comparatively high resistance; but which has greater capacity of resistance against the disintegrating action of the crystallizing saline substances in the battery.

Harmonic Analyzer.—An instrument which resolves automatically a complex harmonic into its simple harmonic components. A receiver containing a vibrating reed acted upon by an electro-magnet and answering only to impulses tuned to its own pitch, and when such impulses are received from the magnet the reed vibrates, but will not respond to impulses not in harmonic frequency.

Harmonic Currents.—Currents which alternate periodically and vary harmonically. Electric currents that are harmonic functions of time. Simple periodic currents the strengths of which are exactly represented by sinusoids.

Harmonic Frequencies.—A succession of frequencies the values of which being integral multiples of their fundamental.

Harmonics.—The doctrine or science of musical sounds. The secondary or less distinct tones which accompany any principal and apparently simple tone.

Harveyizing.—A process by which steel plates are superficially hardened.

Haulage, Electric.—The moving of car or vessel by the action of electricity.

Head-Board of Dynamo.—A board insulated and employed on a dynamo-electric machine to receive terminals or switches.

Head-Board of Motor.—A switchboard connected with and used to start a motor.

- Head Guy.**—A guy made fast to the top of a pole.
- Head-Light, Electric.**—An engine head parabolic reflector illuminated by electricity.
- Head of Liquid.**—The perpendicular distance from the level of a liquid in a vessel to the center of gravity of an orifice placed in it.
- Heat.**—The force agent in nature upon which depends the state of bodies as solid fluid or aeriform, and recognized in its effects by expansion, fusion, evaporation, etc. A form of energy.
- Heat, Electric.**—Heat generated by an electric current passing through a conductor.
- Heat Units.**—Units founded upon the amount of heat necessary to raise one degree of the thermometric scale.
- Hekto.**—A prefix for one hundred.
- Hekto-Ampere.**—One hundred amperes.
- Hekto-Watt Hour.**—One hundred watt-hours, or a unit of work equal thereto.
- Heliograph.**—An instrument for communication by means of sunlight flashes which are made by their manipulation to represent the Morse telegraphic alphabet. An instrument employed for communication between distant points and effected by intercepting at intervals the beams reflected from a mirror, the various durations of which correspond to the Morse signal code.
- Helicostat.**—An instrument by which a sunbeam may be introduced into a dark room from a mirror which is mounted on an axis parallel to the earth's axis, and by means of clock-work the beam is kept in a fixed position despite the rotation of the earth.

Heliotropism.—A twisting on the growth of stalks and stems resulting from the influence of any light source.

Helix.—A spiral line, as of wire in a coil. A circumvolution.

Henry.—The practical unit of electro-magnetic or magnetic inductance.

Henry's Coils.—A number of induction coils separate and connected in a manner so that the currents induced in the secondary of the first coil results in the same effect in the secondary of the second coil, with the primary of which it forms a series connection, and thus throughout the coils.

Hermetical Seal.—A seal obtained in a glass vessel by heating its neck until it is soft and then twisting it until the aperture is accurately closed.

High Commutator Bars.—Commutator bars which in the natural wear of the commutator project beyond the others and require turning down to restore cylindrical symmetry.

High-Economy Lamp.—A lamp of high efficiency.

High Frequency.—A frequency greater than that usually employed.

High-Potential Current.—A term carelessly used to signify a current caused by high electromotive forces.

High-Potential System.—Pressure from 300 to 3,000 volts, according to the National Electric Code.

High-Potential Testing Transformer.—An alternating current transformer which obtains a high alternating pressure from an ordinary alternating current circuit and employed to test insulation.

High-Potential Wires.—Circuit wires highly insulated and used for connection with high potential sources.

High Resistance.—A much higher resistance for any circuit or apparatus than that which is usually employed.

High-Resistance Magnet.—A term applied sometimes to a long-coil magnet of light wire and which possesses high electric resistance.

High-Speed Electric Motor.—An electric motor of the usual design as distinguished from one built to run at low rate of speed.

High-Tension.—A circuit used with high electric pressures.

High Vacuum.—A vacuum approximately or nearly perfect; a vacuum wherein the molecules of the residual gas seldom come into collision with one another in the containing vessel, but move to and fro between its walls, the gas being in an ultra-gaseous condition.

Hissing Arc.—A term applied to a voltaic arc which produces a hissing noise due to too close approach of the carbons.

Holder for Safety Fuse.—A support of infusible material serving to hold a safety fuse and catch the fused metal.

Holders for Brushes of Dynamo-Electric Machine.—The adjustable clamps for holding the armature brushes of dynamos and motors.

Holophane.—A globe or chamber of glass with a lenticular external surface employed for the better dif-

fusion of the light emerging from the enclosed source.

Homopolar Dynamo.—A one-pole dynamo. A dynamo the conductor of which moves constantly past poles of single polarity only.

Horizontal Candle Power.—The intensity of light emitted horizontally from a source.

Horizontal Intensity of Light.—The intensity of light measured horizontally.

Horns of Pole-Pieces of Dynamo.—In dynamo-electric machines the projecting ends of the pole pieces towards or from which the outer uncovered perimeter of the armature turns in its regular operations.

Horse-Power.—A unit or standard by which the capabilities and rate of doing work by a prime mover is measured; estimated as 33,000 pounds raised one foot in a minute.

Horse-Power, Electric.—A rate of electrical performance equal to 746 watts, or 746 volt-coulombs per second.

Horse-Power-Hour.—A unit or standard of work equal to that accomplished by one horse-power during one hour.

Horseshoe Electric Magnet.—An electro-magnet the core of which resembles a horseshoe or the letter U in shape.

Horseshoe Magnet.—A bar of magnetized steel or hard iron resembling a horseshoe or the letter U in shape.

Hot-Wire Ammeter.—An ammeter the readings of which are established by taking as a basis the expansion of a wire, obtained by an increase of tem-

perature resulting from the passage through it of the current to be measured.

Hot-Wire Thermometer.—A thermometer which indicates by means of the expansion of a bi-metallic wire.

Hot-Wire Voltmeter.—A voltmeter the indications of which are based upon the lengthening of a wire occupying a position in the circuit of the electromotive force to be measured.

Hydraulic Power Dynamometer.—A dynamometer serving to measure hydraulic power.

Hydraulic Storage.—The storing of energy by forcing water into elevated reservoirs.

Hydraulics.—That branch of science or engineering which treats of fluids in motion; the transmission of water through conduits or pipes, and the apparatus employed in raising or moving water.

Hydro-Dynamics.—That branch of the science of mechanics which relates to the laws of rest and motion of fluids.

Hydrometer.—An instrument employed to determine the amount of moisture in the atmosphere.

Hypothesis.—A proposition or principle which is assumed in order to draw an inference or conclusion in proof of the point in question. A theory assumed to account for known phenomena.

Hypothetical.—Pertaining to a hypothesis.

Hypsometer.—An instrument employed to determine altitudes by ascertaining the temperature at which water will boil at such altitudes.

Hysteresis.—A tardiness of magnetization in respect to magnetizing force. Molecular friction proceeding

from magnetic variations of stress. A quality inherent in a paramagnetic substance through which energy is dissipated when its magnetization is reversed.

Hysteresis Losses.—Losses of useful energy resulting from hysteresis.

Hysteretic Torque.—The part of the torque of a dynamo-electric machine resulting from hysteretic influence and calling for the expenditure of mechanical work to develop hysteretic energy, as heat in the iron undergoing magnetic reversal.

I.

I. H. P.—An abbreviation for indicated horse-power.

Idle Coil.—A coil through which no current is passing.

Idle Wire.—A wire through which no current is passing or no useful current is passing. An open-circuited armature wire which is not generating E. M. F.

Igniter.—A strip of carbon inserted between the free ends of a candle of the Jablochkoff type and which upon the passage of a current through it becomes incandescent and burns away in a short time, thus forming an arc producing the light.

Ignition, Electric.—The act of igniting an explosive or any combustible substance with heat generated by electricity.

Illuminated Dial Instrument.—An instrument used in engine rooms or central stations, the dial of which is translucent and illuminated from behind in order that the indicator may be seen distinctly from a distance.

Illumination.—The current of light projected on a surface per unit of area from a source of light directly or by reflection, indirectly.

Impact.—The single instantaneous blow or stroke of a body in motion against another either in motion or at rest.

Impedance.—The relation of any impressed electromotive force to the current which is produced by it in a conductor. The sum of all factors offering resistance to a current, whether spurious or ohmic—apparent resistance.

Impedance Coils.—A name sometimes given to choking, economy or reactance coils.

Imperfect Magnetic Circuit.—A term sometimes given to a magnetic circuit in which the intensity of the flux is greater through some parts of the ferric circuit than through others by reason of the magnetizing coil being put only on one part of the core, hence some of the lines of induction instead of completing their circuits through the core itself, do so through the space surrounding the core.

Impressed.—Forced upon or made to act.

Impressed Electromotive Force.—The electromotive force caused to act in a circuit to generate a current in it. The electromotive force expended in causing a current induction in a neighboring circuit.

Impulse.—The motion produced by the sudden or momentary action of a force upon a body.

Impulsive Current-Rush in Inductive Circuit.—An abnormal flow of current occasioned by the sudden switching of a transformer on to an active main.

Incandescence.—The glowing whiteness of a body caused by intense heat.

Incandescent Bombardment Lamp.—An incandescent lamp in which the molecular bombardment resulting from the passage of an electric discharge through a rarefied space raises a refractory material to a state of incandescence.

Incandescent Circuit.—A circuit upon which incandescent lamps are operated.

Incandescent-Cut-Out.—A cut-out adapted to use in an incandescent circuit. A safety-fuse cut-out.

Incandescent Filament.—The filament employed as a conductor in an incandescent lamp, usually of small cross-section.

Incandescent Electric Lamp.—An electric lamp provided with a filament usually of carbon, and which produces the light by being electrically heated to a state of incandescence.

Incandescent Lamp-Cord.—A flexible cord inclosing two conductors and used for a pendant incandescent lamp.

Incandescent Lamp-Socket.—A socket serving to receive and hold an incandescent lamp.

Incandescent Mantle-Burner.—A gauze mantle made of a refractory substance and raised to a state of incandescence by the heat of a Bunsen flame.

Incomplete Circuit.—A broken or open circuit.

Indestructibility of Energy or Matter.—A hypothesis which assumes that matter and energy are indestructible and that the disappearance of them from certain forms is necessarily followed by their reappearance in other forms.

India Rubber.—A substance obtained from the milky juice of a tropical tree.

Indicating Switch.—A switch which employs an indicator from which it can be ascertained whether the circuit of the switch is open or closed.

Indicator Card.—The card from the indicator of a steam engine from which the horse-power is reckoned by means of the curves of pressure which are traced thereon.

Indicator, Electric.—A term used signifying the divers styles of devices which are employed to indicate by the deflection of a needle or the sounding of a bell, at some remote point, the condition of any electric circuit and the strength of current flowing through it, the head of liquid pressure carried by a boiler, the temperature, speed and general working of machinery and the occurrences incidental thereto.

Induced.—Caused by induction.

Induced Current.—A current caused by electro-dynamic induction.

Induced Current of Transformer.—A term applied to the secondary current of a transformer.

Inducing Circuit.—A circuit causing induction.

Inducing Current of Transformer.—A term used for the primary current of a transformer.

Inducing Magnet.—A relay's permanent magnet.

Inductance.—That capacity of a circuit which enables it to exercise induction and create lines of force. The ratio between the total induction through a circuit to the current producing it. A property by virtue of which the passage of an electric current, in producing a magnetic field, is necessarily

accompanied by an absorption of electric energy. A constant quantity in a circuit having no iron and at rest and which is usually expressed in the practical units of induction or henrys.

Induction.—The influence exerted without apparent communication by a magnetic field or a charged mass upon neighboring bodies.

Induction Alternator.—A name used signifying a certain type of alternating generator.

Induction Coil.—A coil wherein the electro-motive force of a portion of a circuit is by mutual induction made to cause higher or lower electromotive force in a neighboring circuit.

Induction Generator.—A generator which furnishes currents that have been reinforced in its coils after receiving them from the line by induction. An alternating dynamo whose generative power is obtained by the inductive action of the main current.

Induction Multihase-Motor.—An alternating-current induction-motor worked by multiphase currents.

Inductor Alternator.—An alternator having both its armature and field fixed and with a rotating frame fixed within it, so as to generate E. M. F. in coils on the armature.

Inductor Alternating Generator.—An alternator in which there is no rotation of field coils or armature coils, and having a rotating iron frame which periodically fills the armature lops with magnetic flux and empties them.

Inductor Dynamo.—A generator with stationary field and armature coils; the motion of inductors passing them altering the magnetic flux through them.

Inductor Generators.—Inductor alternators or dynamos.

Inductors.—Laminated masses of iron in inductor dynamos used to effect variations of magnetic flux of armature and core.

Inertia.—That property in matter by which it tends when at rest to remain so.

Inflection.—The bending of rays of light or radiant energy by defraction when passing by a sharp edge.

Influence.—A term used at times signifying electrostatic induction.

Injector.—An instrument employed to introduce a condenser or other device into an electric circuit at a definite moment and for a definite interval of time.

In-Put.—The power which a machine absorbs in performing a certain quantity of work.

Inside Wiring.—The conductors employed in a system of incandescent lighting to convey the current to the interior of a building which is to be lighted. Conductors located in the interior of a building.

Installation.—A term including all the accessories of and the entire plant necessary for the performance of any specified work.

Installation, Electric.—The establishment of an electric plant.

Instantaneous.—Done in an instant.

Insulate.—To insulate a body in such manner that electricity can neither be conducted to it nor from it.

Insulated Conductors.—Conducting wires covered with an insulating coating.

Insulating Joint.—A joint used for the purpose of in-

sulating a combination gas and electric fixture from the gas pipe.

Insulating Tape.—An adhesive tape of flexible material saturated with rubber, okonite or other insulating substances and used to effect insulation on the stripped ends of wire or electric conductors at joints or wherever else exposed.

Insulating Varnish.—A varnish composed of insulating material.

Insulating Washer.—A washer made of insulating material.

Insulation.—The application or employment of any material or medium by which electricity, heat, light, etc., are prevented from entering into or escaping from the body insulated.

Insulation Break-Down.—Any defect of insulation which prevents or interferes with perfect insulation.

Insulation Resistance.—That resistance offered by an insulated conductor's insulation, expressed in ohms per mile and ascertained by measuring the resistance between the conductor and water into which a portion of the line has been immersed; the length of the immersed portion being known and having its ends above the fluid. The resistance which exists between a conductor and the earth in a circuit through insulating materials which lie between them. A term used to express the resistance of insulating material which covers a wire or conductor. Any resistance offered by insulation.

Intake.—A synonymous term for "in-pu't."

Intake of Dynamo.—The mechanical activity taken in by a dynamo relatively to time.

Integrating Meter.—A meter which records and reckons a quantity relatively to time.

Integrating Wattmeter.—A meter or watt-hour-meter which indicates the whole power that passes through it relatively to time.

Intensity.—The amperage or strength of a current. The strength of a magnetic field or its magnetic density as distinguished from tension in case of dynamic electricity. The degree of concentrated acting forces.

Intensity of Current.—Current strength. Current strength or density taken per unit-area of cross-section.

Intensity of Field.—The intensity of a magnetic field measured at any point by the force with which it acts on a unit magnet pole located at that point. That intensity of field which acts on a unit pole with a force of one dyne.

Intensity of Light.—The degree of energy exerted with respect to candle-power.

Intensity of Magnetization.—A quantity representing the intensity of magnetization caused in a body. A quantity representing the intensity of magnetization conveyed to a magnetizable body or substance. The quantity of magnetism present or induced in a mass and represented by the magnetic lines of force in cross sectional area.

Inter-Connected Armature Winding.—A connection of the separated circuits in a multipolar armature effected in such manner as to provide for the employment of a single pair of brushes on the commutator. An armature cross-connected.

Interior Conduit.—A conduit for the accommodation of house wires and located within the walls or in other suitable spaces inside of a house or building.

Interior-Conduit Junction Box.—A box serving, in an interior system of conduits for the reception of the terminals of feeders, and as a place where feeders and mains or mains and branches are connected.

Intermittent.—Ceasing to act at intervals. Fluctuating.

Intermittent Current.—A current flowing and ceasing to flow at intervals, resulting in the practical presence and absence, alternately, of electricity from a circuit.

Intermittent Earth.—An intermittent contact of a telegraphic or other line with the earth, causing a fault, and which is occasioned by the action of wind or by expansion from heat. A swinging earth.

International Ampere.—The value of the ampere which was defined in 1893 at Chicago by the International Electrical Congress. One-tenth of the absolute C. G. S. unit of current strength, or a value equal to the one-tenth of a unit in the C. G. S. system of electro-magnetic unity and represented with practical exactitude by the unalterable current, which, when consonant with certain specifications while passing through a solution of nitrate of silver in water, deposits the metal at the rate per second of 0.001118 of a gramme.

International Ohm.—The value of the ohm which was defined in 1893 at Chicago by the International Electrical Congress. The practical unit of resistance; 10^9 C. G. S. electro units. On ohmic value

equal to 10^9 units of resistance of the C. G. S. system of electro-magnetic units and represented by the resistance opposed to an electric current by a column of mercury of a constant cross sectional area, 14.4521 grammes in quantity, at the melting temperature of ice, and a length of 106.3 centimetres.

International Volt.—The value of the volt defined in 1893 at Chicago by the International Electrical Congress. An electromotive force, which, steadily applied to a conductor whose resistance is one international ohm, will produce a current of one international ampere, and which is represented sufficiently well for practical use by $\frac{1000}{1434}$ of the electromotive force between the poles or electrodes of the voltaic cell known as Clark's cell, at a temperature of 15 deg. C. or 59 deg. F., and prepared according to certain specifications.

International Watt.—The value of the Watt defined in 1893 at Chicago by the International Electrical Congress. A value which is equal to 10^7 units of activity in the C. G. S. system and equal to performance at the rate of one jouleper-second.

Interrupted.—Opened or broken.

Interrupter.—Any device which breaks or interrupts a circuit.

Inter-Urban Electric Railway.—An electric railway running between neighboring towns or cities.

Inter-Urban Telephony.—Telephonic communication between neighboring towns or cities.

Inverse Current.—A current produced in a conductor when a current is started or strengthened in a

parallel conductor which has a parallel component. The current produced in an induction coil when the circuit of the primary is making or completing.

Inverted Arc-Lamp.—An arc lamp wherein the positive carbon is below or inverted instead of uppermost, as in the regular arc lamp.

Inverted Dynamo.—A dynamo having its armature chamber below the field magnet coils.

Iron-Armored Conduit.—An iron-covered conduit. A conduit wherein each duct is provided with an iron covering or casing.

Iron-Clad.—Covered with iron.

Iron-Clad Armature.—A dynamo or motor armature the insulating coils of which are almost or completely surrounded by the iron of armature core.

Iron-Clad Coil.—A magnet which is iron-clad.

Iron-Clad Dynamo.—A dynamo with an iron-clad armature or encased in iron.

Iron-Clad Electro-Magnet.—An electro-magnet the magnetizing coil of which is almost completely surrounded by iron to augment its portative power, or its inductance, or to protect its magnetic variations, as the case may be.

Iron-Clad Rheostat.—A rheostat with resistance coils having an insulation incased in enamel and sunk into a mass of iron.

Iron-Loss in Transformer.—The loss of energy sustained by a transformer by reason of magnetic hysterics or friction, and also due to the establishment of eddy or Foucault currents in iron.

Iron Magnet Circuit.—A circuit signifying a ferrie circuit.

Isobars.—Imaginary lines connecting those places on the earth's surface where the mean height of the barometer at the level of the sea is the same.

Isolated Electric Lighting.—Electric lighting by a plant situated on the premises lighted, in distinction from one which is situated at a central station and which supplies the current to a number of buildings or to the service of an extended area.

Isolated Plant.—An electric plant supplying the current for lighting a building or an assemblage of structures or buildings, in distinction from one supplying the current from a central station.

Isothermal Expansion of Gas.—The expansion of a gas while maintaining its temperature constant.

Isothermal Surfaces.—Surfaces of a body upon which the temperature is the same at all points.

J.

Jablochkoff Candle.—An arc lamp without regulating mechanism producing an arc between the ends of parallel carbons which are maintained at constant distance apart by the introduction between them of a strip of insulating material.

Jablochkoff's Igniter.—A small carbon conductor in form of a strip, being easily raised to incandescence by a current, and which is introduced between the free ends of the parallel carbons of a Jablochkoff candle, thus forming an arc upon the passage of the current.

Jacobi's Law.—A law of electric motors which states that the maximum work of a motor is performed when its counter electro-motive force is equal to

one-half the electro-motive force expended on the motor.

Jaws of Switch.—A clamp of metal used for the reception of the knife blades of a switch.

Joint.—The point where two or more conductors join.

Joint Resistance.—The united resistance offered by a number of resistances connected in parallel.

Joule.—The practical C. G. S. unit of electric energy which is equal to 10^7 ergs—0.73734 foot pound—.00134 horse-power seconds. The quantity of electric work necessary to raise the potential of one coulcomb of electricity one volt. Ten million ergs.

Joule Effect.—The heating effect of a current flowing through a conductor, produced by its resistance only.

Joule's Law.—A law stating that the heating power of a current is proportioned to the product of the square of its strength and the resistance of the circuit through which it flows.

Journal.—The portion of a shaft or other revolving piece which turns in some other piece or support.

Jumper.—A shunt or short circuit employed, for the time being, around a source, lamp or receptive contrivance on a series connected circuit, in order that it may be easily removed or repaired.

Jump Spark.—A disruptive spark excited between two conducting surfaces in distinction from a spark excited by a rubbing contact.

Junction Box.—A box, proof against moisture, utilized in an underground system of conductors to receive the terminals of feeders, and wherein the feeders are connected to the main, and through which individual consumers are supplied with currents.

K.

K. W.—An abbreviation for kilowatt.

Kaolin.—A variety of clay serviceable for insulating.

Keeper of Magnet.—A bar of soft iron used to connect the poles of a magnet and designed to prevent loss of magnetism, the magnetic flux passing through it.

Key-Board.—A switchboard.

Key Lamp-Socket.—A lamp socket supplied with a key attachment which is manipulated to light or extinguish the lamp.

Keyless.—Having no key.

Keyless Lamp-Socket.—A lamp socket not provided with a key and which depends for its ignition or extinction upon a switch located elsewhere.

Keyless Wall-Socket.—A socket placed on a wall for a lamp and providing for the introduction of a plug switch.

Kick.—A recoil.

Kick of Coil.—A discharge from an electro-magnetic coil.

Kilerg.—One thousand ergs.

Kilo.—A prefix for one thousand times.

Kilo-Ampere.—One thousand amperes.

Kilo-Dyne.—One thousand dynes.

Kilo-Erg.—One thousand ergs.

Kilo-Gauss.—One thousand gauss'es.

Kilogramme.—One thousand grammes, equal to 2.67951 pounds troy or 2.20485 pounds avoirdupois.

Kilo-Henry.—One thousand henrys.

Kilo-Joule.—One thousand joules

Kilo-Volt.—One thousand volts.

Kilo-Watt.—One thousand watts.

Kilo-Watt-Hour.—The result in work equal to the expenditure of exertion of one kilowatt in one hour.

Kilo-Watt Hour Meter.—A wattmeter that records.

Kilo-Weber.—One thousand webers.

Kinetic Theory of Matter.—A hypothesis assigning to the molecules of matter the property of constant motion or vibration towards or from one another in paths lying within the radii of their reciprocal attractions and repulsions.

Kinetics.—The science which treats of motions considered in themselves or apart from their causes.

Kinetoscope.—An instrument for obtaining the effect of a panorama or moving objects by a display of suitable pictures in rapid succession.

Knife-Break Switch.—A knife switch.

Knife-Switch.—A switch with narrow, deep, movable arm, of copper or brass, which when making contact is forced in between two springs connected to one terminal.

Knob Insulator.—An insulator in the form of a knob divided into two parts and utilized to support a single wire by being clamped together with a supporting screw.

Kyanizing.—A process used to preserve telegraph or railroad timbers by the introduction of corrosive sublimate into the pores of the wood.

L.

Lag.—Dropping behind. To be tardy.

Lag of Motor Brushes.—A change of position of the brushes on a motor's commutator in a direction opposed to its rotation for the purpose of obviating sparking.

Lag of Resultant Flux.—In an induction motor, the displacement in phase of the magnetic flux behind the impressed magneto-motive force.

Lagging Electro-Motive Force.—The lagging of an electro-motive force, or component part thereof, behind a current or flux.

Lagging of Current.—The retarding in phase of an alternating current behind the pressure which produces it.

Laminated.—Made up of thin plates, as a laminated armature core or converter core.

Laminated Core.—The subdivision of the core of an armature, induction coil or converter into plates insulated more or less perfectly from each other in order to prevent the formation of Foucault currents.

Laminated Magnet.—A magnet equipped with a laminated core.

Lamp Base.—That part of an incandescent lamp chamber designed for the entrance into the chamber of the leading-in wires and which is supplied with two insulated plates of metal which are connected with the leading-in wires.

Lamp Circuit.—A circuit having electric lamps or lamp.

Lamp Cut-Out.—An application for automatically cutting a series connected arc lamp out of a circuit when the carbons are entirely consumed.

Lamp Dimmer.—A reactive coil serving to vary the intensity of incandescent lights connected with an alternating circuit. A resistance coil in series with lamps.

Lamp Efficiency.—Ordinarily a term used to signify the watts consumed by a lamp per candle power delivered, but more properly expressed as the reciprocal of that, or the number of candles obtained from an incandescent lamp per watt supplied to it.

Lamp-Hour.—A unit of commercial supply of electric force. The volt-coulombs necessary to operate an electric lamp for one hour.

Lamp Indicator.—An instrument serving in a central station to indicate the presence of the proper voltage or potential difference on the mains. A lamp serving on a telephone switch board which indicates the calling or ringing off by a subscriber.

Lamp Rod.—A rod contained in a common arc lamp serving to support the positive carbon, and the rods serving to support both carbons in a focusing lamp.

Lap Joint.—A joint in which the ends are overlapped and secured in place by riveting or otherwise. A joint secured by firmly lapping together the ends of two conducting wires and then wrapping them with a separate wire or by soldering.

Lap Winding.—A winding for disc and drum armatures consisting of lapping back each lead of wire towards the preceding lead upon the commutator end of the armature.

Latent.—Not visible or apparent. Hidden.

Launch, Electric.—A launch employing electric-motive power.

Law.—The regular sequence by which certain phenomena or effects follow certain conditions or causes. The uniform relations according to which forces act in producing effects or are manifested in phenomena.

Law of Ohm.—The law which expresses the relation existing between current electro-motive force and resistance in an active electric circuit. Ohm's law.

Law of Volta.—A law which states that in an electro-chemical series the electro-motive force which exists between any two metals will amount to the entire electro-motive force between all the metals which intervene.

Laws of Becquerel.—Becquerel's law for the magneto-optic rotation of the plane of polarization.

Laws of Coulomb.—Laws for the force of magnetic attraction and repulsion between magnetized bodies or adjacent magnet poles.

Laws of Faraday.—Laws of electrolytic decomposition.

Laws of Joule.—Laws of the production of heat by the passage of an electric current through a circuit.

Lead.—A conductor which is insulated and leads to and from a source. An insulated conductor employed in a telegraphic system for leading to an instrument, circuit battery or station. A conductor in a multiple connected circuit which is connected to the positive terminal of the source. An insulated conductor in a system of electric distribution which leads to a main, a station, source, feeder or testing device.

Lead Accumulator.—A storage cell formed by the immersion of two leaden plates in diluted sulphuric acid.

Lead Burning.—Securing a junction by partially fusing two lead plates together.

Lead-Covered Conductors.—Insulated conductors encased in lead.

Lead of Brushes of Dynamo-Electric Generator.—An angular deflection from the regular position in the direction of the armature's rotation which is given to the brushes on the commutator for the purpose of obviating sparking.

Lead of Brushes of Dynamo-Electric Generator.—The angular change from the regular position to one in an opposite direction to the armature's rotation, made with the brushes on an electric-motor, when the load is increased, for the purpose of obviating sparking.

Leading-In Wires.—The wires which lead into a building or structure from an aerial circuit. The wires through which passes the current into and out of an incandescent electric lamp. Wires leading a circuit into any enclosed space.

Leads.—The conductors which are connected to a source's positive and negative terminals in a system of parallel distribution or any system of electric distribution. Conductors through which the current is led to or from any source or circuit.

Leak.—Any escape of energy by leakage.

Leakage.—A loss from leaks.

Leakage Drop.—The drop resulting in a circuit from leakage.

Leakage, Electric.—The dissipation by degrees of a current or charge arising from imperfect insulation.

Leakage Flux.—That part of the field flux which produces no useful effect by reason of its failure to pass through the armature of the dynamo or motor.

Left-Handed Armature-Windings.—A sinistrorsal winding applied to the core of armatures.

Left-Handed Dynamo.—A dynamo whose movement is counter-clockwise when observed from the pulley end.

Left-Handed Helix.—A sinistrorsal helix or one wound left-handed.

Left-Handed Motor.—(See Left-Handed Dynamo.)

Left-Handed Rotation.—A sinistral rotation. A rotation opposed to the direction in which the hands of a clock move.

Left-Handed Solenoid.—A solenoid whose windings are sinistrorsal or rising from left to right.

Legal Ohm.—An ohm whose value was defined in 1884 by the Electrical Congress in Paris. The practical unit of resistance equal to the resistance of a column of mercury one square millimeter in cross sectional area and 106 centimeters long at the temperature of 0 degrees C. (32 degrees F.), as distinguished from the B. A. unit of resistance ohm, used previously to 1884, or the international ohm, defined in 1893 at Chicago by the International Congress.

Length of Spark.—The air space traversed by a disruptive discharge.

Lens.—Any transparent substance ground with two op-

posite regular curved surfaces and serving to bring a beam or ray of light to a single focus.

Lever Brake for Car.—A style of car brake thrown into action by means of a brake handle.

Lever Hook.—An automatic telephone switch hook designed to hang the receiver on when not in use.

Leyden Jar.—A form of static condenser consisting of a glass jar with metallic coatings placed opposite to each other on the inside and outside of the jar.

Lichtenberg's Dust-Figures.—Figures produced on a surface of shellac by rubbing over it the knob of a Leyden jar or other excited electrode which leaves upon the non-conducting surface an electrified path to which a sprinkling of dried, powdered sulphur and red lead will cling, thus forming the figures.

Life Curve of Incandescent Electric Lamp.—A characteristic curve showing the life of an incandescent lamp by the use of ordinates which respectively represent the life in hours and the candle power at constant pressure.

Life of Electric Incandescent Lamp.—The number of hours that an incandescent lamp will, when running under normal pressure, supply an efficient light.

Light.—The source of the illuminating medium by means of which objects are rendered visible and distinct.

Light Load of Machine.—A load considerably less than the capacity of a machine.

Lightning Arrester.—An appliance serving to protect

the apparatus in any electric circuit from the damaging effects of a discharge of lightning.

Lightning-Arrester Board.—A board to which a lightning arrester is connected.

Lightning Rod.—A lightning conductor in form of a rod attached to the outside of any structure to protect it from a discharge of lightning by conducting the electricity into the ground.

Lightning Stroke.—A discharge of electricity between two clouds oppositely charged or from a cloud to the earth.

Limit Switch.—A small switch provided on an electric car connected in series with the brake discs, working automatically, and so contrived that it cuts out the fields of both motors when the breaking current is too great. A switch released by the action of a clock, thereby cutting off the supply at a predetermined time.

Limiting Distance of Speech.—The distance to which a circuit can be extended in a straight line before telephonic communication becomes impracticable. The point to which a telephone line may be extended and communication successfully maintained subject to the electrical conditions of the circuit and the character of the apparatus provided.

Line Dynamometer.—A dynamometer serving to indicate whether a line, in course of overhead construction, has been drawn up to proper tension.

Line Insulator.—An insulator serving to support an aerial line.

Line of Least Sparking.—The diameter on the commutator determining the position of the brushes where sparking is at its minimum.

Line Reactance.—A line conductor's reactance.

Line Section of Electric Railroad.—Any portion of an electric railroad line, insulated in such manner from other parts as to allow the separate control of the supply of electric power.

Lines of Electrostatic-Force.—Lines of force assumed to be present in an electrostatic field of force and to which they give existence. Lines whose prolongation is in the direction in which the force of electrostatic attraction or repulsion acts.

Lines of Magnetic-Force.—Lines of force which indicate the distribution of magnetic-force. Lines of force whose prolongation is in the direction in which the force of magnetic attraction or repulsion acts.

Line-Man.—A person who erects and keeps line circuits in repair and cares for the attending equipment.

Link-Fuse.—A plate of fusible metal in the shape of a link, employed as a safety fuse, the ends of which are suitable for connecting copper fuse-wire terminals.

Link-Fuse Cut-Out.—A cut-out using a link fuse.

Liquid Compass.—A style of compass for ships, the needle of which is suspended not only by gimbals, but is also contrived in a manner which provides for the checking of its oscillations by a surrounding liquid.

Liquid Flow.—The amount of liquid escaping from an opening or passing through the cross-section of a pipe or conduit in a specified time.

Liquid Resistance Load.—An artificial load for a dynamo consisting of a quantity of liquid, usually salt brine, placed between suitable electrodes.

Liquefaction.—The conversion of a solid into a liquid by the sole agency of heat; or in the case of gas, by the abstraction of heat or by the combined effect of pressure and low temperature.

Listening Cam.—A form of switch employed in a telephone exchange to connect the operator's telephone with a subscriber's line.

Lithanode.—A block of compressed lead binoxide, with platinum connecting foils employed as an electrode in a storage battery.

Live Wire.—A wire through which a current is flowing.
A wire connected with a source of electric power.

Load.—The work required of a machine. The amperes of current delivered by a dynamo under any given conditions.

Load-Diagram of Station.—A curve representing the expenditure of current from a station for any given length of time.

Load-Factor.—The relation of the average to the maximum load.

Loadstone.—(See Lodestone.)

Local Action of Dynamo-Electric Machine.—The loss of energy sustained by a dynamo resulting from the establishment of eddy currents in its core, pole pieces and other conducting bodies.

Local Battery.—A battery which supplies a local circuit in telegraphy, where it is principally used; the battery being thrown in and out of action by a relay; its current performing the work of actuating the sounder and any other local or station instrument.

Local Currents.—Currents within the metal parts of a

dynamo. A term sometimes applied to Foucault currents.

Lock, Electric.—A lock which, by means of a distant push button, is automatically released.

Locomotive, Electric.—A locomotive driven by electricity, or whose motive power is electricity.

Locomotive Head-Light, Electric.—(See Head-Light, Electric.)

Lodestone.—Magnetic magnetite or naturally magnetized iron ore.

Log, Electric.—A device for electrically measuring the speed or the distance traversed by ships.

Logarithm.—The power to which a given invariable number called the base must be raised in order to produce that number.

Logarithmic Curve.—A curve in which the ordinate's rate of increase or decrease is proportionate to itself.

Long-Arc System of Electric Lighting.—A system of lighting in which long-arcs are used requiring high electro-motive forces.

Long-Connection Armature-Winding.—A connection of a two-circuit armature-winding effected in a manner to produce electro-motive forces in each circuit by field poles of one polarity only.

Long Connection of Two-Circuit Gramme-Windings.—A style of gramme-winding wherein the two circuits from brush to brush comprise conductors which are influenced by one-half the poles only.

Long-Core Electro-Magnet.—An electro-magnet having a long core.

Long-Distance Carbon Telephone Transmitter.—A tele-

phone transmitter of microphonic character employed on long distance lines.

Long-Distance Telephone Cabinet.—A closed cabinet designed to exclude external noises and insure secrecy in telephonic communications.

Long-Shunt Compound-Wound Dynamo-Electric Machine.—A dynamo, compound wound, and with its shunt-field magnet coils forming a shunt to the binding posts of the machine.

Loop-Circuit.—A term used sometimes for a circuit in multiple or parallel arc. A circuit having one wire going out and the other returning, thus distinguishing it from an earth-return circuit.

Loop-Switch.—A switch employed to open or close a loop or for throwing it out of or into a main circuit. A switch employed to connect a branch office with a duplex or quadruplex switch at a main office, thus enabling messages to be sent and received on the duplex or quadruplex system.

Loop-System of Parallel Distribution.—A system providing for the connection of two mains to a generator in a manner intended to equalize the drop or pressure, and effected by connecting one main directly to the generator at the home end, and connecting the other, by a separate wire, at its distant end, to the generator.

Loop Winding.—A term applied to lap winding.

Loop-Winding of Alternator.—An alternator armature-winding which provides for the laying of the wire in loops on the outside of the armature core.

Loose Carbon Transmitter.—A telephone transmitter in which loose carbon is used.

Loose Contact.—A contact formed by two or several surfaces reposing one upon another loosely or employing their weight only. A poor contact.

Loud-Speaking Telephone.—A term used to designate a telephone characterized by the intensity of sound emitted by its receiver.

Loudness.—The degree of intensity of sound corresponding to the amplitude of vibration.

Low-Frequency.—A frequency of not many alternations comparatively, per second.

Low-Potential Current.—A term applied at times to a current or low pressure circuit.

Low-Potential System.—Less than 300 volts; according to the National Electric Code.

Low-Resistance Magnet.—A magnet having low resistance magnet coils.

Low-Speed Electric Motor.—An electric motor constructed to run at low speeds.

Low Tension.—Another term for low pressure.

Lubrication.—The act of making slippery for the purpose of reducing friction between surfaces. Interposing a thin film of material between two sliding surfaces.

Luminescence.—The power which is to a certain degree possessed by some bodies for giving out light, previously acquired by them, through exposure to radiant energy or light.

Luminosity.—The quality of being luminous, and a term sometimes applied to a source.

Luminous Absorption.—The absorption by bodies of luminous energy in its passage through them.

Luminous Efficiency.—The relation which the luminous radiation given out by a source, bears to the whole radiant energy that such source emits in a specified time.

Luminous Heat.—The radiation of heat attended by physiologically effective frequencies.

Lux.—A standard for illumination in distinction to illuminating power. A unit of illumination equal to the light projected on each square metre of the inside of a sphere, the radius of which is one metre from a bougie decimale situated at its center. The normal illumination which one carcel will produce at the distance of one metre.

M.

Magnet.—A substance which possesses the power of attracting iron or of producing magnetic flux. A mass or body which has the property of attraction for the opposite pole in another magnet or of repelling the like pole or of inducing magnetism in bodies susceptible to magnetization.

Magnet Coil.—A coil of insulated wire which surrounds the core of an electro-magnet and through which the magnetizing current flows.

Magnet Cores.—The bar or mass of iron wound with insulated wire, which produces an electro-magnet by the passage of the magnetizing current.

Magnetic Adherence.—A tendency noticeable in bodies of iron to adhere to the poles of a magnet.

Magnetic Attraction.—The attraction of unlike magnetic poles for each other.

Magnetic Axis.—The line which connects the poles of a magnet.

Magnetic Battery.—A term applied to a compound permanent magnet, constructed by clamping to single iron pole pieces a number of single permanent magnets.

Magnetic Belting.—A belting which provides for the riveting of strips of sheet iron on the belt which, by reason of the iron driving pulley being magnetized, the friction or grip upon the pulley is increased by attraction.

Magnetic Blow-Out.—A device employed to extinguish an arc by means of the flux produced by an electro-magnet.

Magnetic Blow-Out Lightning-Arrester.—A lightning arrester in which, by the action of the flux of an electro-magnet placed in the circuit of an arc, the arc when formed is extinguished.

Magnetic Circuit.—The course along which magnetic flux passes.

Magnetic Circuit-Breaker.—A circuit breaker whose action is produced by an electro-magnet.

Magnetic Circuit-Closer.—A circuit closer whose action is produced by an electro-magnet.

Magnetic Closed-Circuit.—A circuit possessing the magnetic polarity of iron.

Magnetic Clutch.—A clutch in which to obtain the friction required, magnetic attraction is substituted for mechanical force.

Magnetic Concentration.—The freeing of ores from their metals by magnetic attraction.

Magnetic Curves.—The representation of magnetic

lines of force on a sheet of paper which has been sprinkled with iron filings, and obtained by gently agitating the paper and holding it in the magnetic field.

Magnetic Declination.—The angular deflection of the magnetic needle causing it to rest at an angle with the true meridian.

Magnetic Density.—That strength of magnetism which is represented by lines of force per stated area of cross section in a plane at right angles to the lines of force.

Magnetic Dip.—A deviation from the horizontal by a magnetic needle moving in the vertical plane.

Magnetic Divining Rod.—A small dipping needle used to locate the approximate position of iron ore in the earth.

Magnetic Equator.—A location on the earth's surface where the magnetic needle maintains its horizontal position. A line, approximately stated, equally distant from the magnetic poles of the earth. The aclinic line.

Magnetic Explorer.—A small coil of insulated wire employed to ascertain the position and extent of the magnetic leakage of a dynamo or other electric machine, and used in connection with the circuit of a galvanometer or telephone.

Magnetic Fatigue.—The increase in the hysteretic coefficient of iron resulting from an assumed fatigue following numerous cyclic reversals.

Magnetic Fatigue of Transformer.—The augmented hysteretic loss of a transformer.

Magnetic Figures.—The grouping of iron filings ob-

tained upon paper or glass held near magnetic poles.

Magnetic Flux.—Magnetic induction. The total lines of force which flow through any magnetic circuit.

Magnetic Force.—The forces of attraction and repulsion which a magnet exercises; by some theories identical with the forces of attraction and repulsion of electric currents.

Magnetic Friction.—The damping effect which proximity to a magnet causes to the movements of a body of metal.

Magnetic Fringe at Edge of Dynamo Pole Piece.—A lateral diffusion of magnetic flux forming the outlying edge of a magnetic field, or an apparent fringe of magnetic flux in the air around the poles.

Magnetic Gearing.—A species of friction gearing in which magnetic adhesion is utilized.

Magnetic Hysteresis.—A molecular friction resulting from magnetic change of stress. Magnetization which lags behind the magnetizing force. A quality of a magnetic substance which is the occasion of the absorption of energy upon the reversal of its magnetization.

Magnet Induction.—The strength of magnetism which is in an induced magnet, caused partly by the polarized particles of material which surround it and partly by the magnetic field. The density, in air, of magnetic force; and in all magnetic materials it is the sum of the magnetic force and the magnetic flux produced in the iron thereby. Total density of magnetic flux. Magnetization induced in a magnetizable substance when brought into magnetic flux.

Magnetic Inertia.—The lack of power of a magnetic core to acquire or to part with its magnetism instantly.

Magnetic Intensity.—The intensity of the magnetization of a body determined by the magnetic lines of force passing through a unit area of the body, the area being at right angles to the direction of force.

Magnetic Joint.—A joint made between adjacent pieces of iron forming parts of a magnetic circuit.

Magnetic Lag.—The tendency of a mass of iron to take up magnetism slowly. The tendency of an iron core to resist magnetization resulting in retardation. Magnetic retardation.

Magnetic Lightning-Arrester.—Any lightning arrester using an electro-magnet. An electric-magnetic blow-out arrester.

Magnetic Limit.—The temperature above which a magnetic substance cannot be magnetized.

Magnetic Lines of Force.—Lines along which a free magnetic pole would be impelled. Lines of force indicating the distribution of magnetic force. Flux paths.

Magnetic Needle.—A needle or slender rod magnetized. A magnetized bar of steel with a slight depression at its center which permits of its being poised upon a sharp pin so as to freely rotate or oscillate in a horizontal plane; sometimes so pivoted above and below at its center as to enable it to move freely in both vertical or horizontal planes.

Magnetic North.—The point of the horizon to which the north-seeking pole of a magnet points.

Magnet Permeability.—The specific susceptibility of any mass to magnetization. Magnetic inductive capacity.

Magnetic Polarity.—Polarity acquired by a magnetizable substance from magnetic flux when subjected to its influence.

Magnetic Poles.—Those members of a magnetic source at which the flux enters or leaves.

Magnetic Potential.—The potential at any point of a magnetic field is the work which would be done by the magnetic forces of the field upon a positive unit of magnetism as it moves from that point to an infinite distance.

Magnetic Repulsion.—Repulsion reciprocally exerted between like magnet poles.

Magnet Retentivity.—The resistance offered by a body to any variation of magnetization. The property of iron or other magnetic substance by which it slowly receives and parts with a magnetic condition. Hysteretic retention of magnetism after the magnetizing force has been withdrawn.

Magnetic Saturation.—The maximum magnetic force which can be permanently imparted to a magnetic substance.

Magnetic Screen.—A box of soft iron, whose sides are as thick as practicable, serving to protect bodies within it from the action of a magnetic field external to it.

Magnetic Shield for Watches.—An iron case for the reception of a watch and serving to shield it from the influence of external magnetic flux.

Magnetic Sounds.—Small sharp sounds attending the

magnetization and demagnetization of easily magnetizable substances. The hum of a transformer.

Magnetic Sticking of Armature.—The adhesion of an armature to the magnet poles caused by hysteresis.

Magnetic Stress.—The stress which magnetic lines of force produce on substances which they flow through. That quality of flux by virtue of which magnetic strain is produced in bodies subjected to its influence.

Magnetic-Vane Ammeter.—An ammeter in which a fixed plate of soft iron is placed within the coil, having freedom to move or serving as an axis, so that when the field is excited the two repel each other like polarity being induced in each, and the motion of the movable soft iron indicates the strength of the current.

Magnetic-Vane Voltmeter.—A magnetic vane wound for high resistance.

Magnetic Voltmeter.—An instrument wherein a movable needle is deflected against the action of the field of a magnet by the magnetic field of a current proportional to the difference of the potential to be determined.

Magnetization by Touch.—A method of magnetizing by applying the poles of the inducing magnet to the substance to be magnetized.

Magnetize.—To impart magnetic properties to a magnetizable substance.

Magneto.—An abbreviation for magneto-electric generator.

Magneto-Blasting Machine.—A magneto-electric machine serving to generate the currents employed in blasting by means of electricity.

Magneto Call-bell.—A call bell principally used in telephone systems and operated by a current from a magneto-electric generator.

Magneto-Dynamics.—The branch of dynamics which treats of the reciprocal influence of magnet poles.

Magneto-Electric Alternating Machine.—An alternator the field flux of which is produced by permanent magnets.

Magneto-Electric Machine.—A magneto-generator.

Magneto-Generator.—A dynamo electric machine the field flux of which is produced by permanent magnets.

Magnetophone.—A form of magnetic siren which produces sounds in a telephone by means of periodic currents in its coils produced by a perforated disc of metal rotating in a magnetic field. The “Busy” signal.

Magneto-Telephone Transmitter.—A transmitter consisting of a strong compound magnet having a coil of insulated wire fixed in front of one of its poles and an iron core constituting the pole piece of the magnet.

Magneto-Therapy.—Asserted claims of electro-therapeutic effects obtained by applying magnets to the human body.

Magnet Wire.—Insulated wire ordinarily cotton-covered, serviceable for winding magnets.

Main-Circuit Fuse.—A safety fuse employed in a main circuit for its protection.

Main-Circuit Switch.—A switch introduced into a main circuit.

Main Cut-Out.—A cut-out introduced into the circuit of a main.

Main-Feeder.—The main feeder in a district. The feeder with which is connected the standard pressure indicator by whose pressure that, at the ends of all the other feeders, is controlled.

Main-Line Cut-Out.—(See Main Cut-Out.)

Main Switch.—A switch which is connected to the electric mains. The main switch which controls a group of auxiliary switches.

Mains.—The parallel conductors which in a parallel system of distribution carry the main current and to which devices for transferring are connected.

Make.—To complete a circuit or close it.

Make-and-Break.—To complete and open a circuit alternately.

Man-Hole of Conduit.—An opening in the surface of the road bed, large enough to admit a man, and communicating with an underground conduit.

Man-Power.—A unit of power represented by about 75 Watts and equal to the one-tenth of a horse power.

Marconi Rays.—Electro-magnetic rays used in Marconi's system of wireless telegraphy.

Marine Galvanometer.—A Thompson's galvanometer of the reflecting type employed on shipboard, the needle of which is enclosed in a heavy iron box to shield it from the motion of magnetized masses of iron which otherwise would disturb the reading of the instrument.

Mariner's Compass.—A compass so mounted as to be suitable for use on shipboard.

Marked End of Magnet.—A term formerly employed to indicate the north-seeking pole of a magnet.

Marked Pole of Magnet.—A term sometimes used for the north-seeking pole of a magnet.

Mass.—A body of matter concentered, assembled or formed into a lump. The quantity of matter which a body contains.

Mass, Electric.—A term signifying quantity of electricity; the unit mass representing such a quantity as will operate at unit distance with unit force.

Mass Specific Resistance.—The resistance offered by the known mass of a material, viz.: one gramme, in the form of a circular sectional wire one metre long.

Master Clock.—A central clock, in a system of time distribution, which transmits the time of the subordinate clocks in its circuit.

Matt.—A term used in electro-plating and signifying the appearance of the deposit of metal which is interlaced and compactly massed in an electro-plating of silver.

Matter.—That of which the sensible universe and all existent bodies are composed, which has three dimensions and is perceptible to the senses.

Maximum.—Having the greatest value. A value greater than any which precedes or follows it in a succession of values.

Maximum Activity of Motor.—The rate of doing work at the greatest possible capacity, or the activity developed when the useful work performed is equal to one-half the energy expended. The maximum activity.

Maximum Horizontal Intensity of Light.—The greatest intensity of light emitted horizontally by a source.

Maximum Magnetization.—A term at times applied to the greatest magnetic saturation.

Maximum Starting-Current of Motor.—The greatest value attained by the starting current of a motor.

Mean.—Average. Having an intermediate value between two extremes.

Mean Annual Station-Current.—The average current which a station delivers during a year.

Mean Current.—Time average of current strength. The time average of current strength, in an alternating current circuit, without respect to sine or direction.

Mean Electro-Motive Force.—Time average of electro-motive force. The time average of the E. M. F. in an alternating current circuit without respect to sine or direction.

Mean Horizontal Intensity of Light.—The average intensity of light in the horizontal plane of the source.

Mean Spherical Candle-Power.—An average candle-power equal numerically to the whole quantity of light given out by a point source divided by 12, 566. The average candle-power of a source of light given out in all directions.

Measurements, Electric.—The determinations of the values of quantities as applied to electro-motive force, capacity, resistance, energy, etc., in an electric circuit or instrument.

Mechanical Air Pump.—A mechanical device by means

of which the air is exhausted from, or compressed into, any vessel.

Mechanical Characteristic of Motor.—A term at times used to signify the torque and speed of a motor as co-ordinates.

Mechanical Equivalent of Heat.—The mechanical energy corresponding to a given quantity of heat energy or the equivalent of mechanical energy in heat which would be necessary to raise the temperature of a unit mass of water to one degree Fahr.

Mechanical Friction of Dynamo.—The frictions of the brush, journals and air of a dynamo.

Mechanical Work.—The action of force through space against resistance. The expenditure of energy necessary to effect a change in the external form of any material mass.

Medical Battery.—A medical induction coil.

Medical Induction-Coil.—An induction coil employed in electro-therapeutics.

Meg or Mega.—A prefix meaning one million times.

Mega-Dyne.—One million dynes.

Mega-Joule.—One million joules.

Mega-Lines.—One million lines.

Mega-Volt.—One million volts.

Mega-Weber.—One million webers.

Megerg.—One million ergs.

Megohm.—One million ohms.

Megohm Box.—A box offering a resistance equal to one million ohms.

Mercurial Air-Pump.—An air pump operated by mercury to obtain high vacuum; used largely for exhausting incandescent lamp chambers. The Sprengel or Giessler air pumps.

Mercurial Connection.—A style of easily adjustable connection accomplished by supplying the poles of one piece of apparatus with cavities containing mercury into which the terminals of another piece of apparatus are immersed, so that they may be placed in circuit with each other.

Mercurial Contact.—An electric contact obtained by means of mercury.

Mercury Cup.—A cup containing mercury and serving as a mercurial contact.

Mercury Gauge.—A vacuum gauge which depends upon the height of a mercury column for its indications.

Mercury Tube.—A glass tube, sealed and containing mercury so arranged as to give out fluorescent light when shaken.

Metal-Cased Blake Transmitter.—A transmitter provided with a sheath of metal.

Metallic Arc.—An arc which forms between metallic electrodes.

Metallic Circuit.—A circuit composed wholly of metal and thereby distinguished from an earth-return circuit.

Metallic Conductor.—A circuit composed of metal.

Metallic Electrolysis.—A mode of cataphoretic treatment effected by making a contact of the part to be treated with a metallic electrode connected to the positive pole of a continuous current source,

while the negative pole is brought into contact with some other part of the body, thus driving cataphoretically the metallic salts, formed by electrolysis at the anode, into the tissues beneath the electrode.

Metallic Filament.—A metallic wire used in an incandescent lamp as a filament.

Metallic Resistance.—A term at times employed to signify the resistance of wires or conductors as opposed to the resistance of insulating materials.

Metallic Solution.—A solution of metallic salt.

Metallo-Chromes.—A name by which Nobili's rings are known. Prismatic colors which make their appearance when, under certain circumstances, an oxide is electrolyzed.

Metallurgy.—The art of working metals comprehending the whole process of the reduction or treatment of metallic ores or metals.

Meteorites.—Fragments of solid matter in space which, when coming within the earth's influence are attracted by it, becoming incandescent by their passage through the atmosphere.

Meteorology.—The science which treats of the atmosphere and its phenomena.

Meter, Electric.—An instrument employed to measure the quantity of electricity which passes in a specified time through a consumption circuit.

Meter-Motor.—A small motor serving to operate an electric meter.

Metre.—A measure of length equal to 39,370 English inches or 39,368 American inches; the standard of lineal measure intended to be the ten millionth

part of the distance from the equator to the north pole.

Metre-Bridge.—A slide style of Wheatstone's bridge, the slide wire being one metre long.

Metric Factors.—Factors used to convert the units of the metric system into those of other systems.

Metric System of Weights and Measures.—A system of weights and measures founded on the gramme.

Mica.—A mineral substance more or less transparent used for insulating and other purposes.

Micanite.—An insulating material made of mica and shellac.

Micro.—A prefix meaning the one millionth.

Micro-Ampere.—The millionth of an ampere.

Micro-Coulomb.—The millionth of a coulomb.

Micro-Farad.—The millionth of a farad.

Micrometer Caliper.—A Micrometer gauge.

Micrometer Wire-Gauge.—A delicate form of wire gauge fashioned with a fine thread screw and a graduated head for making accurate measurements of wire diameters.

Microhm.—The millionth of an ohm.

Microphone.—A style of telephone transmitter used on a telephone in order that faint sounds may be made audible and clear.

Microphone Relay.—An appliance by means of which a telephonic message is automatically repeated over another wire.

Microscope.—An optical instrument for examining objects which are too minute to be viewed by the naked eye.

Micro-Volt.—The one millionth of a volt.

Mil.—A unit of length; one thousandth part of a lineal inch.

Mil-Foot.—A unit of resistance consisting of the resistance of a foot of wire one thousandth of an inch in diameter. The resistive standard by which wires are measured or compared.

Milli.—A prefix meaning the one thousandth part.

Milli-Ampere.—The one thousandth of an ampere.

Milli-Volt.—The one thousandth of a volt.

Mine Explorer, Electric.—A small magneto-electric generator used for direct blasting.

Miniature Incandescent Lamp.—A diminutive incandescent lamp serviceable for dental, surgical, microscopic or decorative work.

Mining Locomotive, Electric.—An electric locomotive used in mining work.

Minotto's Voltaic Cell.—A cell of the Daniell's type having at the bottom of the cell a flat copper plate underneath a mass of copper sulphate crystals, and filled then with wet sand or saw dust, upon which the zinc plate rests.

Minus Charge.—A negative charge.

Mirror Galvanometer.—A galvanometer the deflections of whose needle are read by an image projected by light reflected from a mirror attached to the needle, or to a vertical wire carrying the needle.

Mirror Receiving-Instrument.—A receiving signaling instrument, to whose needle or wire carrying it, is attached a mirror, and which is used in sub-marine telegraphy.

Mixed-Circuit Board.—A telephone switchboard connected with mixed circuits, some of which being metallic and the others ground return circuits.

Mixed Distribution.—A distribution of electric force combining both parallel and series distribution.

Moderate-Speed Generator.—A generator constructed to run at a moderate speed and in that respect differing from a slow-speed generator.

Moderate-Speed Motor.—A motor constructed to work at a moderate speed and in that respect differing from a slow-speed motor.

Molar Attraction.—Gravitation. The attraction of mass for mass as distinguished from molecular attraction.

Molecular.—Pertaining to molecules.

Molecular Accommodation.—A re-adjustment of the molecules in paramagnetic material which results, by continued repetition, in a diminution in the hysteretic friction in cyclic magnetization.

Molecular Agitation.—Quick mechanical vibration imparted to a mass of iron in order to diminish its magnetic hysteresis.

Molecular Attraction.—The mutual attraction of molecules for each other. Physical affinity. Cohesion or adhesion.

Molecular Bombardment.—The collisions occurring between contiguous molecules quickened by heat. The movement in straight lines of molecules from the negative electrode and from side to side of a vessel when the residual gas therein contained is brought to a sufficient state of rarefaction; their courses being affected by heat or electric discharge,

which causes them to impinge upon the positive electrode, producing luminous effects.

Molecular Resistance.—The resistance, which a mass of an electrolyte offers when contained in an insulating vessel, made of material of an equal specific gravity and which has two opposite parallel conducting faces, at a distance of one centimetre apart.

Molecular Vibration of Telephone Diaphragm.—The molecular vibration which takes place in the diaphragm of a telephone under the influence of modifications in the magnet's magnetization; marking a distinction as to its molar vibration.

Molecule.—One of the invisible particles supposed to constitute matter of any kind. The minutest quantity of a compound substance that can have existence.

Moment.—The product of the force by the shortest distance from the point of rotation to the extension of the line of the force, when a force is applied so as to tend to produce rotation around a point; such distance being the perpendicular to the extension of the line through the point of rotation.

Moment of a Couple.—The effective power of a couple. A force which tends to cause torsion around an axis, as in the pulling or turning moment of the armature of an electric motor upon its shaft.

Moment of a Magnet.—A magnet's polar length multiplied by the intensity of magnetism of one of its poles.

Momentary Current.—A current which flows for a short time only.

Momentum.—The quantity of motion in a moving body, being always proportioned to the quantity of matter multiplied into the velocity. Impetus.

Monocyclic Armature.—The armature of a monocyclus generator having two sets of windings, one constituting the main winding and corresponding to that of an ordinary uniphaser, the other being of smaller cross-section, having less turns, and being connected in diphasic relation, to the center of the main winding.

Monocyclic Generator.—A style of polyphase generator having a monocyclic armature.

Monocyclic System.—An alternating-current distribution system, for electric lighting; being also capable of operating triphase induction motors. A system for distributing alternating currents using three wires; an ordinary uniphase pressure being maintained between two of them while there is a diphasic pressure between either of them and the third one.

Morse Recorder.—An apparatus which automatically records the dots and dashes of the Morse telegraphic alphabet on a ribbon of paper drawn under an indenting point of a striking lever attached to the armature of an electro-magnet; being thus distinguished from a Morse inker.

Morse System of Telegraphy.—A telegraphic system in which by alternating makes and breaks of varying duration the dots and dashes of the Morse alphabet are reproduced and received by an electro-magnetic sounder or other receiver.

Morse Telegraphic Sounder.—An electro-magnet which

produces, by the movement of its armature lever, the dots and dashes of the Morse alphabet.

Motor Car, Electric.—An electrically driven car.

Motor Circuit.—A circuit supplying an electric motor or motors.

Motor-Controlling Rheostat.—A rheostat which is connected with a motor and serves to start the motor or govern its speed.

Motor Cut-Out.—A cut-out in the circuit of a motor provided for the purpose of throwing it out of circuit.

Motor-Dynamo.—A motor electrically driven and firmly connected to the armature of a dynamo for the purpose of modifying the current.

Motor Starting-Box.—A box equipped with a starting rheostat or controller.

Motor Starting-Rheostat.—An adjustable rheostat designed to prevent an abnormal flow of current through a shunt-wound motor when starting.

Motor Torque.—The rotary effort which an electric motor develops.

Motor-Transformer.—A transformer which a motor operates. A motor-generator, rotary transformer or dynamotor. A dynamo-electric machine provided with two armature windings; one serving to receive current as a motor, the other to deliver current, as a generator, to a secondary circuit.

Motor Truck.—The truck of an electric car equipped with supports from which to suspend an electric motor.

Moulded Carbons.—Carbons artificially manufactured

by subjecting carbonaceous substances to pressure in a mould.

Moulded Mica.—A substance used for insulating and made of finely broken mica formed into a paste with insulating material and moulded, before cooling, into the shape required.

Moulding Wiring.—Wiring effected by enclosing the wires in suitably shaped moulding which is placed on the walls or ceiling of a room.

Mouldings Electric.—Mouldings made of seasoned non-conducting wood, longitudinally grooved, in order to receive and hold insulated wires.

Mouth-Pieces.—Circular orifices communicating with the air chambers placed over the diaphragms of telephones, graphophones, gramophones or phonographs to facilitate the application of the mouth when speaking, in order to produce vibration in the diaphragm.

Movable Secondary.—The secondary of an induction coil which is movable instead of being rigid as in most coils.

Multi-Circuit Arc-Dynamo.—A dynamo with an armature which has several circuits and intended to avoid too great an electro-motive force on any one circuit.

Multi-Circuit Arc-Light Generator.—An arc-light generator intended to furnish current to a number of series-connected arc-circuits, being in this respect distinguished from one intended to supply one circuit only.

Multiphase.—Containing more than one phase.

Multiphase Alternating-Currents.—Several separate al-

ternating currents which vary in phase by an established amount.

Multiphase Alternator.—An alternator having the capacity to produce multiphase currents.

Multiphase Apparatus.—A term applied generally to multiphase motors, alternators, or other receptive apparatus serviceable on multiphase circuits.

Multiphase Induction-Motor.—An induction motor operated by rotating magnetic fields and serviceable in connection with multiphase currents.

Multiphase Synchronous-Motor.—A synchronous alternating-current motor furnished with multiphase currents, as contrasted with an asynchronous or induction multiphase motor.

Multiphaser.—A multiphase alternator.

Multiple-Arc-Circuit.—A term frequently applied to a multiple circuit.

Multiple-Arc Connected Sources.—A battery consisting of multiple connected sources.

Multiple Armature-Windings.—A term applied at times to multiple-circuit armature windings.

Multiple Cable.—A cable having more than one conducting wire or circuit.

Multiple Circuit.—A circuit in which the positive poles of a number of separate sources and receptive devices are connected to a single positive lead or conductor; their negative poles being connected to a single negative lead or conductor.

Multiple-Circuit Multiple-Wound Armature.—An armature providing a number of circuits between the brushes, and in addition, a number of independent

windings which are connected to independent commutator bars symmetrically interspersed.

Multiple-Pair Brush-Yoke.—A contrivance which holds a number of pairs of brushes on the commutator in a manner enabling them all to be simultaneously moved or rotated on it.

Multiple-Parallel Circuit.—A term at times applied to a multiple of parallel circuits.

Multiple Rheostat.—A rheostat the resistances of which can be thrown into a circuit in multiple, thereby increasing the carrying capacity as the resistance decreases.

Multiple Running.—The running of generators in parallel.

Multiple-Series.—Series groups connected in multiple.

Multiple-Series Circuit.—A circuit wherein a number of individual sources or receptive devices or both are connected in series in a number of separate groups, these groups being subsequently connected in multiple.

Multiple-Series-Connected Sources.—A number of individual electric sources connected in multiple-series in such manner as to be able to act as single sources.

Multiple Unit System of Railway Traction.—A system of electric railroad wherein each traction unit is supplied with its own independent motors, so that all the units may be operated from a single point collectively.

Multiple Windings.—Independent windings arranged in a symmetrical manner upon the same armature and insulated from each other, yet carried to different segments of the commutator.

Multiple-Wound Multiple-Circuit Armature.—A multipolar armature provided with a number of windings each winding having a number of circuits between the brushes.

Multiple-Wound Two-Circuit Armature-Windings.—A multipolar armature with a number of windings, there being two circuits between the brushes for each winding.

Multiple Working of Dynamo-Electric Machines.—A term used sometimes to signify the parallel working of dynamo electric machines.

Multiplex Telegraphy.—A system of telegraphy which provides for the simultaneous transmission of more than two separate messages in opposite directions and over a single wire from each end.

Multipolar Armature.—An armature employed in a multipolar field.

Multipolar-Drum Armature-Windings.—Windings of a drum armature adaptable to a multipolar field.

Multipolar Dynamo.—A dynamo having a multipolar field.

Multipolar Field.—A field generated by several separate magnets.

Multipolar Generator.—A multipolar dynamo.

Multipolar Motor.—A motor the field magnets of which have several separate magnet poles.

Multipolar Railway-Generator.—A generator provided with a multipolar field and serving to supply current to trolley cars.

Multipolar-Ring Armature-Winding.—A winding of a ring armature suitable for a multipolar field.

Municipal Series Circuit.—A series circuit serving to distribute lights and adaptable for lighting streets.

Municipal System of Incandescent Electric Lighting.—A system of distribution for incandescent electric lighting wherein the individual lamps are connected to the circuit in series, each lamp being equipped with an automatic cut-out.

Mutual Flux of Transformer.—The magnetic flux which flows through both of a transformer's coils as contrasted with magnetic flux which may, when excited, pass through one coil to the exclusion of the other.

Mutual Induction —Induction which two adjacent circuits produce on each other by the mutual inter-connection of their magnetic fluxes. Induction caused in charged conductors adjacent to each other, by the inter-connection of their electrostatic fluxes.

Myograph.—An instrument employed to determine nervous sensibility.

Myopia.—Near-sightedness.

Myria.—A prefix meaning ten thousand times.

N.

N.—An abbreviation for North-seeking magnet.

N. H. P.—An abbreviation for nominal horse power.

Name Plate.—A plate attached to a dynamo-electric machine giving the maker's name and such other information as weight, power, speed, current, etc.

Natural Law.—The co-relation of phenomena. The in-

variable sequence attending the manifestation of phenomena.

Natural Magnet.—See Lodestone.

Nautical Mile.—A knot. A distance equal to 6,087 feet or about 1.15 statute miles, and the one-twenty-one thousand six-hundredth of the circumference of the earth at the equator or one-sixtieth of a degree of longitude at the equator.

Nautical Telegraphy.—Telegraphic communication at sea between vessels and aboard single vessels.

Needle.—A word meaning a magnetic needle.

Needle Annunciator.—An annunciator which indicates with a needle instead of by the fall of a drop.

Needle System of Telegraphy.—A system of telegraphy which provides for the indication of the letters in the alphabet and numerals by the oscillating movement of a magnetic needle.

Needle Telegraph.—A term in general use signifying the apparatus used in needle telegraphy.

Negative Brush of Motor.—The brush which is connected with the negative terminal of a dynamo.

Negative Electricity.—A phase of electric excitement, observable, for instance, when resin is rubbed with silk.

Negative Electrode.—The electrode which is connected to a source's negative terminal.

Negative Feeder.—Feeders which connect the negative mains with the negative poles of a generator.

Negative Plate of Storage Cell.—The plate of a storage cell which, by the action of a current, becomes partly covered with a coating of spongy lead. The plate of a storage cell which is connected to a

charging source's negative terminal, constituting therefore the negative pole of the cell on discharging.

Negative Plate of Voltaic Cell.—The electro-negative element of a voltaic couple. That part of a voltaic cell's plate above the liquid which becomes the positive pole of the cell.

Negative Pole of Source.—The pole of an electric source through which the current is supposed to go in or to pass back into the source, after having passed through the circuit connected to the source.

Negative Side of Circuit.—That side of a circuit which is opposite the positive sides. The side of a circuit into which current flows after having performed a duty or function. That side of a circuit which is connected with the negative pole of a source.

Net Efficiency.—The ultimate efficiency of machines or transferring contrivances through which energy must pass in distinction from the separate efficiency of each machine or device.

Network of Conductors.—A term used to describe a number of conductors so interconnected as to resemble a net in appearance.

Neutral Ampere-Meter.—An ampere meter in a three-wire system of distribution which is connected with the neutral bus-bar.

Neutral Conductor.—In a three-wire system, the neutral wire.

Neutral Feeder.—The feeder connected with the neutral bus-bar in a three-wire system.

Neutral-Line of Magnet.—The equator of the magnet.

Neutral Point.—A term signifying indifference.

Neutral Points of Magnet.—Points which are nearly midway between the poles of a magnet.

Neutral Salt.—A salt devoid of basic or acid properties.

Neutral Wire.—The wire, in a three-wire system of distribution, which is connected with the neutral dynamo terminals. Of a three-wire system, the balance wire.

Nickel Bath.—An electrolytic bath which contains a salt of nickel easily electrolyzable, having a nickel plate which serves as the anode of the battery, and which is immersed in a liquid in proximity to the article to be plated, which serves as the cathode.

Nipple of Negative Carbon.—A diminutive elongation of the carbon which occurs on the surface of the negative carbon facing the crater of the positive one while the arc is going.

Noise.—A confused collection of discordant tones.
Clamor. Din.

Noisy Arc.—A voltaic arc which emits frying and hissing sounds during maintenance.

Nominal Candle-Power.—A term used at times signifying the candle-power of a luminous source obtained in a suitable direction.

Non-Arcing Fuse.—A fuse wire which, by reason of being made of non-arcing metal, or encased in an air-tight tube, blows without forming a voltaic arc.

Non-Arcing Metal.—An alloy composed of the blending of a certain assemblage of metals, which will not, under some conditions allow an alternating-current arc to be maintained between them.

Non-Conductor.—A material of low conductivity or high electric resistance.

Non-Ferric.—Without iron.

Non-Ferric Inductance.—An inductance of a circuit devoid of iron or not associated magnetically therewith. The inductance possessed by a coil which has a non-magnetic core.

Non-Ferric Magnetic Circuit.—A magnetic circuit without iron, or one which contains only non-magnetic materials, such as copper, wood, air, etc.

Non-Homogeneous Current-Distribution.—That distribution of current which flows through a conductor, wherein there is over any cross-section of it, a current of unequal density.

Non-Magnetic Steel.—Alloys of irons incapable of being magnetized, composed of such substances as manganese or nickel steel.

Non-Oscillatory.—Not changing the direction of motion; not oscillating in motion.

Non-Polar Transformer.—A term applied to a closed iron-circuit transformer.

Non-Polarizable.—Devoid of the ability of being polarized.

Non-Polarized Armature.—An armature composed of soft iron and which, regardless of the direction in which the current flows through the coils, is drawn towards the poles of an electro-magnet, when the circuit is completed.

Non-Synchronous Motor.—An alternating current motor possessing the ability to start at any load; one not forced to run in concurrence with its driving current.

Normal.—Consonant with rule. Regular.

Normal Current.—The force of current at which a system is intended to work.

Normal Voltage.—The voltage at which a system is intended to work.

North-Seeking Magnetic Pole.—The pole of a magnet which points to the earth's north geographical pole.

Nose Suspension of Motor.—The hanging of a motor in a car truck by a hook from above instead of from a bar and spring from underneath.

Null of Zero Method.—Any method by which comparisons or measurements are secured, the accuracy of the measurements being determined by the deflection of the galvanometer being null or nought. For example, the Wheatstone bridge.

O.

O.—An abbreviation for ohm.

O. K.—A telegraphic signal meaning “yes” or “all right.”

Obtuse Angle.—A term applied to an angle greater than a right angle or containing more than 90 degrees.

Occluded-Gas Process.—A method of depleting a vacuum tube or incandescent electric lamp chambers of the residual air, and which is effected by the application of a high degree of temperature to the tube or lamp before sealing, and while connected with the pumps.

Octo-Polar Dynamo.—A multipolar dynamo the field of which possesses eight poles.

Octo-Polar Field.—A field resulting from the flux of eight distinct magnetic poles.

Off Position of Switch.—The position assumed by a switch when throwing off, from the working current, a section of a circuit.

Ohm.—The practical unit of resistance; electro-magnetic units 10^9 degrees C. G. S. A resistance such as would confine the electric flow under an electro-motive force of one volt to a current of one ampere or coulomb per second.

Ohmage.—The value of a circuit's resistance expressed in ohms.

Ohmic.—Pertaining to the ohm.

Ohmic Drop.—The drop in pressure resulting from ohmic pressure.

Ohmic Resistance.—A resistance in distinction from spurious resistance, or counter-electro-motive force.

Ohm Meter.—An instrument serving to measure directly the resistance of a conductor or of any section of a circuit through which a strong current is flowing.

Ohm Mile.—A standard of conductivity consisting of wires one mile long and which offer a resistance of one ohm at a standard temperature. A mass of material, which would at a standard temperature enable a wire of that material to show a resistance of one ohm.

Ohm's Law.—The basic law which expresses the relations between current electro-motive force and resistance in active electric circuits.

Oil Insulator.—An insulator containing oil.

Oil Paper.—A material for insulating composed of paper which has been saturated with an insulating oil.

Oil Transformer.—A transformer put into oil for the purpose of securing and maintaining high insulation.

Okonite.—A kind of insulating material.

One-Layer Armature-Winding.—An armature winding which consists of one layer of wire only.

Opacity.—Not possessing the property of transparency.

Open-Arc.—A voltaic arc not enclosed.

Open Car-Wheel.—A style of car-wheel containing perforations in the space between the flange and the journal.

Open Circuit.—A circuit which is broken.

Open-Circuit Battery.—A battery employed in open-circuit work, its principal requirement being that it must not run down or become exhausted when left on open circuit.

Open-Circuit of Triphase Connections.—The triphase circuit's star-connection.

Open-Circuit Thermostat.—A thermostat employed on an open-circuit.

Open-Circuit Transformer.—A transformer the magnetic circuit of which is completed to some extent through air.

Open-Circuited.—Having an open or broken circuit.

Open-Coil Armature.—An armature which has some of its coils on open circuit during a part of the armature's rotation.

Open-Coil Drum Dynamo-Electric Machine.—An open-

coil dynamo-electric machine with a drum-wound armature.

Open-Wire Symmetrical Twist.—A method of running aerial telephone wires with a view to obviating cross-talk; all the wires on a pole being twisted along the line.

Open Work.—Open wiring.

Opening a Circuit.—The breaking of a circuit.

Opening Shock.—The shock resulting in an electric circuit containing self-induction upon opening or breaking the same.

Operator's Set.—A telephone set used by the operator at a central station.

Optics.—The science which treats of the phenomena of light.

Optical Efficiency of Light.—The relation between the obscure and luminous radiation.

Optical Strain.—A defect in a plate of any transparent medium produced by the action of a stress and accompanied by a modification in the optical properties of the medium.

Ordinate.—The distance of any point from the axis of abscissas, in a system of plane co-ordinates, measured parallel to the axis of ordinates.

Ordinary Relay.—A relay not polarized.

Oscillating Current.—A current periodically alternating.

Oscillation.—A vibration or movement back and forth.

Oscillations, Electric.—The rapid and sudden alternations, in static electricity, attending the discharge of a static condenser; the discharge being of a dis-

ruptive character, but appearing to consist of a number of discharges which alternate in direction and produce electro-magnetic ether waves of the same nature as light waves; the latter, however, being shorter and much less rapid.

Oscillator.—A device which produces oscillations.

Oscillator, Electric.—A device serving to produce electric currents of a steady period without regard to any variations in its driving force.

Oscillatory Dynamo.—A dynamo which has electromotive forces generated in its armature coils by a vibratory or oscillatory movement through a magnetic field.

Osmose.—The equal blending of liquids with varying densities through the pores of a separating medium.

Osmose, Electric.—When two liquids are separated by a porous diaphragm and a strong current of electricity is passed through from the liquid on the one side through the diaphragm, to the liquid on the other side, the liquid on the side to which the current is passing rises in level.

Outboard Bearing.—A journal bearing extended beyond the base frame of a machine in order to obtain sufficient support for a long or heavy shaft.

Outboard Bearing of Dynamo-Electric Machine.—A bearing extended beyond the base frame of a dynamo electric machine in order to properly support the motor.

“Out-door” Transformer.—A transformer located outside of a building at a suitable place.

Outgoing Current.—The current which goes out from a station over a line.

Outlet.—A point in a wall or ceiling where branch wires come out and which are to be connected to a switch, lamp, etc. The places about a building where the fixtures or lamps are attached.

Outlet Block.—A fuse block located at or close to an outlet. A block which has an outlet protected by a fuse wire.

Outlet Box.—A box located at or close to an outlet to facilitate the making or changing of electric connection with the outlet conductors.

Output.—The useful energy which any machine gives out.

Output of Dynamo-Electric Machine.—The electric power of current which a dynamo electric generator develops at the delivery terminals and indicated in volt-amperes, kilo-watts or watts.

Outtrigger.—An arm attached at right angles to a pole in order to support it.

Outtrigger for Arc-Lamp.—A fixture attached at right angle to the vault of a building for the purpose of suspending an electric arc-lamp therefrom.

Outside Wiring.—The wiring outside of a building or structure for a circuit.

Over-Compounded.—Compound winding of such a character on a dynamo-electric machine that the voltage at its terminals is caused to increase under a greater load.

Over-Compounded Dynamo.—A dynamo, the magnetomotive force of whose series coils compensates for the drop in the armature and for the drop in a

conductor ranging from the generators to the motors, thus allowing the outer conductors to be considered as an extension of the armature winding, whereby the generator delivers a constant pressure at its terminals at the motor.

Overhead Conductor.—A conductor erected overhead.

Overhead Feeders.—Feeders erected overhead.

Overhead Switch.—A switch placed overhead and serving to control an overhead circuit, also one placed on a car over the motorman for his ready manipulation.

Overhead Trolley-System.—A system in which the current that propels an electric street car is taken from a wire overhead.

Overhead Trolley-Wire.—A common aerial trolley wire.

Overlapping Winding of Alternator Armature.—A winding by overlapping the successive coils in contrast to one by mechanically separating successive coils.

Overload.—A load having an abnormal value. Too heavy a load.

Overload of Electric Motor.—A load in excess of that which an electric motor is designed to carry with its greatest operating efficiency. A load so excessive as to produce damage to the motor by heating.

Overload Switch.—A switch provided in order to open a circuit automatically in case of an overload.

Overloaded Conductor.—A conductor loaded with an electric current greater than that for which it was designed.

Over-Winding of Series Motor.—A series motor having too strong a field winding.

Over-Wound Motor Field.—A motor field in which the full strength is developed with much less current than usually required. An over-compounded motor field.

Ozone.—Oxygen in an active or highly electro-negative state.

Ozonizer.—An apparatus employing electric discharges to produce ozone.

P.

Pacinotti Projections.—Teeth in an armature core projecting radially from the central shaft in a manner to form slots or chambers for the insertion of the armature coils.

Pacinotti Ring.—An armature core in the form of a ring with projections and serving for the reception of the armature winding in Pacinotti's generator.

Packing of Telephone Dust Transmitter.—The forming into a cake of carbon dust in a transmitter which materially impairs the efficiency of the apparatus.

Palladium.—A metal of the platinum group.

Palladium Alloys.—Divers alloys composed of palladium with metals principally having no paramagnetic properties and used where desirable to obtain freedom from the disturbance of powerful magnetic fields, as, for instance, the hairsprings of watches.

Panel Board.—A switchboard built and connected in panels.

Panel of Switchboard.—A sub-section of a panel board.

Paper Cable.—A cable insulated with paper.

Paper Carbon.—Filaments for incandescent lamps made of carbonized paper.

Paper Insulation.—Insulation made of paper.

Parabola.—A curve known as one of the conic sections and formed by the intersection of the surface of a cone with a plane parallel to one of its sides.

Parabolic Reflector.—A reflector of light or a mirror whose surface is a paraboloid and which reflects in lines parallel with each other the rays of a light located at its focus.

Paradox.—Something seemingly absurd or contradictory; but yet true in fact.

Paraffine.—A hydro-carbon very valuable for insulating. The wax from mineral oils.

Paraffined Wire.—Wire whose textile covering is coated with paraffine.

Paraffining.—Coating with paraffine.

Parallel Circuit.—A term signifying multiple circuit.

Parallel Connected Triphasers.—Several triphasers which are connected parallel with an ordinary set of triphase mains.

Parallel Coupling.—A term applied at times to the parallel connection of generators.

Parallel Distribution.—A distribution of electricity wherein the receptive contrivances are adjusted between two or every two of a number of parallel conductors running to the limits of the system.

Parallel Feeding.—Supplying the necessary current to a number of receptive contrivances connected in parallel.

Parallel Series.—A term used signifying a multiple-series connection.

Parallel Transformer.—A transformer employed in a parallel system of distribution or connected with parallel mains.

Parallel-Working of Dynamo-Electric Machines.—Several dynamos operating parallel.

Paramagnet.—A magnet obtained from the magnetic influence of iron or other magnetic substance.

Paramagnetic.—Having magnetic properties or the capacity to concentrate magnetic lines of force.

Paramagnetic Permeability.—Susceptible to penetration by magnetic force.

Partial Contact.—Defective contact producing high resistance in two telegraphic circuits.

Partial Disconnection.—A defective metallic contact, or lack of perfect metallic connection.

Partial Vacuum.—A vacuum not complete.

Party Lines for Telephone Service.—Lines by which a number of subscribers in one circuit are connected, as distinguished from lines assigned to single subscribers. Or, lines by which a number of telephonic stations are connected together in contrast to those which connect each station through an exchange.

Parz Gravity Cell.—A couple consisting of zinc-carbon used with common salt or sulphate of magnesia and sulpho-chromis salt, the different density of the liquids keeping them separated in the cell.

Paste Joint for Lamp Filament.—A species of joint made of a moist hydro-carbon paste and then carbonized, and used between leading-in wires and the ends of a lamp filament.

Pasted Secondary Cell.—A secondary cell where a paste or cement composed of the active material is applied to the surface of the grid.

Path of Magnetic Leakage.—A path followed by escaping magnetic flux from the main path where it is usefully employed.

Patrol Alarm-Box.—A box designed for the use of a patrol in telegraphic or telephonic systems whereby any call or alarm can be given.

Paying-Out.—Passing out submarine cable while it is being laid from a ship.

“Pea” Lamp.—A very diminutive form of incandescent lamp.

Pear Push.—A push contact resembling a pear in shape and attached to the end of a pendant flexible cord.

Peltier Effect.—The heating effect produced by the passing of a current through the junction of two unlike conductors.

Pencil Microphone.—A carbon microphone, the loose carbon being in the form of a pencil or pencils.

Pendant Cord.—A flexible conductor by means of which a pendant lamp or push is supplied with current.

Pendant, Electric.—A suspended fixture upon which an incandescent lamp or contact is supported and held in a socket attached to it.

Pendulum, Electric.—A pendulum which the intermittent action of an electro-magnet actuates, the

pendulum itself opening and closing the circuit by means of a point at its lower extremity contacting as it swings to and fro through a globule of mercury, thus opening and closing the circuit.

Penthode Working.—A five-way method of telegraphic working which is obtained by the employment of the synchronous multiplex system of Delaney.

Percentage Conductivity.—The percentage of conductivity of a conductor based upon the Mathiessen standard.

Percentage Conductivity of Wire.—The conductivity of wire, taking as a standard the conductivity of pure copper. The conductivity of wire based upon the Mathiessen standard of conductivity for copper.

Perforated Armature.—An armature having perforations for the introduction of the coils.

Period.—The time necessary to effect the completion of a periodic motion. The full alternation of an oscillatory discharge or of an alternating current.

Period of Vibration.—The time consumed by the execution of a complete vibration or movement back and forth.

Periodic.—Pertaining to a period.

Periodic Alternating Electromotive Force.—An electromotive force with periodically varying direction.

Periodic Current.—A current with periodically varying strength or direction. A current alternating periodically.

Periodicity.—The state of having regular periods in changes. The rate of succession in fixed phases.

Periodicity of Alternation.—The rate of succession of alternations per second or per minute. The frequency.

Peripheral Speed.—The rapidity of rotation as indicated by a point on the circumference of a revolving wheel or cylinder.

Peripheral Velocity.—The rate of peripheral speed.

Peripheratic Region.—A region embracing other regions within itself.

Permanency, Electric.—In electric current conductors the power to retain conductivity unaffected by lapse of time.

Permanent Intensity of Magnetization.—The intensity of a permanent magnetization produced in hard steel, in contrast to that temporarily produced in soft iron.

Permanent Magnet.—A term applied to a hardened steel magnet possessing high magnetic retentivity.

Permanent-Magnet Voltmeter.—A voltmeter which under the united action of a coil and a permanent magnet against the pull of a spring measures differences of potential by means of the movement of a magnetic needle.

Permanent Magnetism.—Magnetism which permanent magnets possess.

Permanent Magnetization.—A term signifying magnetism caused in a body of hard iron or steel when subjected to the influence of a magnetic field. Magnetization existing in a permanent magnet.

Permeating.—The penetration of magnetic flux. The close interstitial permeation of a magnetizable mass.

Permissivity.—Permittivity.

Perpendicular.—A line at right angles to a given line or surface.

Personal Equation.—An error of observation peculiar to the individual and due to his optical or mental condition.

Petticoat Insulator.—An insulator having at its lower end a deep groove resembling a petticoat. A single cup telephone or telegraph insulator.

Phase.—The interval of time elapsing from the time a particle moves through the middle point of its course to the instant when the phase is to be stated; exhibited in wave, oscillating and simple harmonic motion. One complete oscillation.

Phase Indicator.—An instrument which indicates when the pressure of an alternator is in phase with that of the circuit it is to be connected with. A synchronizer.

Phase of Vibration.—The position of the molecules in motion in a vibration at any moment of time pending the wave period as contrasted with their mean position.

Phase-Splitter.—An instrument whose function is to so affect an incoming alternating current that when it passes out again it does so in different branches and as a number of currents of different phase. An instrument serving to cause difference of phase in currents by which a single phase induction-motor is enabled to start itself.

Phase Splitting.—The act of causing an alternating current to split up into a number of currents differing in phase.

Phase Transformation.—A change of phase effected by means of a transformer which transforms two phase currents into three phase currents or the reverse.

Phase-Windings.—The individual windings on a poly-phase motor's armature.

Phenomenon.—Any appearance or thing visible in nature or the knowledge of the existence of which is acquired.

Phone.—An abbreviation for telephone. A telephone communication.

Phone.—To communicate by telephone.

Phonic Wheel.—A single form of small motor consisting of a toothed wheel of soft iron and operated in synchronous rotation by electric excitation produced over a telegraphic line, and used in the synchronous multiplex telegraph system of Delaney.

Phonograph.—An instrument which records and repeats speech or sounds.

Phonograph Record.—A record of speech or sounds taken by the phonograph.

Phonoplex Telegraphic-Receiver.—A particular kind of telephone receiver used in connection with phonoplex telegraphy, which is affected by short current excitations; but not by prolonged ones.

Phonoplex Telegraphy.—Double telegraphic transmission over a single wire without interruption; effected by the superposition of telephonic currents upon common Morse currents which set a modified telephonic receiver in action, thus obtaining simultaneous transmission.

Phosphorescence.—The capacity to exhibit faint light without sensible heat.

Phosphorescent Glow.—Phosphorescent light given out by the residual gas in a vacuum chamber for a few moments after the electric charge leaves it.

Photo-Chemical.—Pertaining to photo-chemistry.

Photo-Chemistry.—The science treating of the chemical action of light.

Photo-Electric.—Pertaining to the united action of light and electricity.

Photo-Electric Cell.—A cell having the capacity to cause difference of potential when its opposed surfaces are unequally exposed to light.

Photo-Electric Impulsion Cell.—A photo-electric cell whose sensibility to light has been impaired; but which can be re-established by gentle mechanical agitation or by electro-magnetic excitation.

Photo-Electricity.—A variation of electric potential resulting from light action.

Photo-Engraving.—Engraving done by means of light.

Photo-Fluoroscopy.—An image photographically produced upon a fluoroscopic screen.

Photographic Negative.—An image the lights and shadows of which are the opposite of those of the original.

Photographic Positive.—An image the lights and shadows of which correspond to those of the original.

Photometer.—An apparatus employed to determine the intensity of the light emitted by a specified light or by any source of illumination.

Photometer Bar.—A photometer in which the lights to be compared are placed at or opposite to the ends of a bar or scale of certain length, generally 60 to 100 inches, the bar having a photometer screen which indicates the relation of the intensity of the lights compared by the distance of the screens from their sources.

Photometer Bench.—A photometer bar with accompanying photometric apparatus or without it.

Photometer Box.—A box having the light excluded and in which the photometer screen is put.

Photometer Disc.—A photometer screen.

Photometer, Electric.—An instrument serving by means of electricity to measure the intensity of light.

Photometer Screen.—A screen, opaque or transparent, serving in a photometer to measure the intensity of light; the two illuminations to be compared being projected upon it.

Photometric.—Pertaining to a photometer.

Photophone.—An instrument serving to transmit sound along a ray of light in place of a conducting wire.

Photophore.—An instrument used for making examinations of the cavities of the body by means of a small incandescent lamp adjusted in a tube with a convex lens and concave mirror.

Physical Change.—Any modification in the forms of matter occurring by reason of a re-adjustment of its molecular assemblage without forming new molecules; in contradistinction to chemical changes.

Physical.—Pertaining to nature.

Piano, Electric.—A piano played by means of an electric motor or electro-magnets, which excite the mechanism controlling the hammers which strike the strings.

Pickle.—An acid solution serving to clean metallic surfaces before electro-plating.

Pile.—A voltaic or galvanic battery. A name given to batteries only which have plates superimposed and not containing vessel; the Dry Pile, for instance, or Volta's Pile.

Pilot Lamp.—A lamp transversely connected to a dynamo's terminals and serving to indicate about what pressure it is producing. A lamp employed on a central station dynamo to indicate by the intensity of the light emitted, the difference of potential at the terminals of dynamo.

Pilot Motor.—A diminutive motor which leads or sets in operation a working one. A small motor arranged to actuate the controller of a large motor.

Pipe Conduit.—A conduit consisting of metallic pipes incased in or lined with a cementing compound.

Pitch.—The distance from center to center of any two adjacent teeth of gearing measured on the pitch-line. The distance measured on a line parallel to the axis, between two adjacent threads of a screw. The succession of musical tone vibrations. The frequency of a tone produced electrically. The distance, on dynamo armature, between successive corresponding conductors. The number of coils in which advance should be made in effecting end connections between the coils of an armature winding divided into segments.

Pitch Line.—A line encircling the surface of an armature through the center of the inductors' length, which are put thereon.

Pith.—A light and soft spongy substance forming the central part of exogenous trees and plants.

Pith Balls.—Balls made of pith and employed in the construction of electroscopes and for other purposes in static electricity.

Pith-Ball Electroscope.—An electroscope the indications of which are shown by the attractions and repulsions of pith balls.

Planimeter.—An instrument designed to measure by mechanical means, and at once, the area of any plane figure drawn on paper, and so contrived that when the tracer has passed over the irregular outline of a figure the index shows the area of the figure.

Plant.—The fixtures, tools and machinery necessary to carry on any mechanical business. An installation.

Plant Efficiency.—The efficiency of an electric plant. The efficiency of a plant and which is to be distinguished from the distribution system by which it may be operated or which it operates.

Plant Efficiency of Motor.—The efficiency of motor in a plant considered apart from the system with which it is connected.

Plastic.—Capable of being moulded, formed or modeled.

Plastic Rail-Bond.—A rail-bond on railroads where sodium amalgam or other conducting substance is applied in plastic form in order to obtain contact of rail ends.

Plate Condenser.—A static condenser having a flat piece of glass for dielectric. Two circular brass plates mounted on insulated supports and arranged to be moved towards or away from each other; between them being a plate of glass or other dielectric, the apparatus being used to illustrate the principle of the electric condenser.

Plated.—Covered with a metallic coating by the process of electro-plating.

Plating.—A word signifying electro-plating.

Plating Dynamo.—A dynamo which furnishes the current employed in electro-plating.

Platinoid.—An alloy of copper, nickel, zinc in the proportions of german silver with 1 or 2 per cent of tungsten and useful for its resistive qualities.

Platinum.—A metal of the color of silver with a specific gravity of 20, which may be increased by heat and pressure to 21.5. It is heavier than iron, undergoes no alterations in the air, resists acids, is very ductile and is the heaviest and least expansible of the metals.

Platinum Alloy.—Ordinarily an alloy of platinum and silver.

Platinum Black.—Metallic platinum in the form of a black powder obtained by decomposing a weak solution of chloride of platinum by the agency of galvanism, and much used in chemical experiments.

Platinum Fuse.—A slender wire of platinum raised to incandescence by the passage of an electric current and used to explode a charge of powder.

Platinum-Iridium Alloy.—An alloy of platinum and iri-

dium valuable for its low temperature-coefficient of resistance and hence often used for resistance coils in electrical instruments.

Platinum Lamp.—A lamp equipped with a platinum incandescent filament.

Platinum-Silver Alloy.—An alloy of platinum and silver, one and two parts respectively, and possessing a low temperature coefficient of resistivity.

Plug Cut-Out.—A cut-out which uses fuse plugs.

Plug Resistances.—Separate resistances introduced into the circuit by removing plugs. The resistances pertaining to the common resistance box.

Plugging.—The employment of plugs in completing a circuit. The making of connections in a switchboard by introducing plugs into the jacks.

Plunge Battery.—A battery the plates of which are so arranged as to be immersed in the battery cups or cells when the battery is to be used and withdrawn and supported out of the cups or cells when not in use, thereby obviating waste of the plates by standing in the solution.

Plunger Switch.—A switch whose operating lever cylinder is surrounded by a bushing in the switchboard in order that contacts may be made or broken on reverse side of board.

Plus Charge.—A positive charge.

Pneumatic.—Pertaining to pneumatics.

Pneumatics.—That branch of science which treats of the mechanical properties of air and other elastic fluids.

Pocket Galvanometer.—A galvanometer adapted to pocket use.

Poggendorff's Voltaic Cell.—The Grenet cell.

Points of Compass.—The thirty-two points into which a compass card is divided at equal intervals around its periphery.

Polar.—Pertaining to a pole.

Polar Bore of Field Frame.—The hollow bored into a field frame to receive an armature.

Polar Relay.—A relay employed in telegraphy and which has a normally polarized armature, thus differing from a neutral relay the condition of whose armature normally is magnetically neutral.

Polar Surface of Magnet.—The surface of a magnetic substance through which the magnetic flux passes in or out. The surfaces either of one or both of a magnet's poles.

Polar Tips.—An addition made of iron to the field magnet pole piece of a dynamo-electric machine.

Polarity.—That quality of a body in virtue of which it exhibits opposite properties in opposite directions. The possession of poles.

Polarity Indicator.—An instrument employed to indicate the polarity of a magnet or the direction of a current.

Polarization of Electrolyte.—A supposed arrangement of molecular assemblage in which the positive poles of any one assemblage face the negative plate, whilst their negative poles face the positive plate.

Polarization of Light.—The state of a ray of light in which the ether-vibrations producing the light are confined to a single plane; the plane called "plane of polarization" being perpendicular to it.

Polarization of Voltaic Cell.—An accumulation of gas—hydrogen usually—on the surface of a voltaic cell's negative element.

Polarized Armature.—An armature possessing polarity exclusive of that communicated by the working current.

Polarized Bell.—An electro-magnetic bell equipped with a polarized armature.

Polarized Indicator.—An electro-magnetic indicator provided with a polarized armature.

Polarized Relay.—A telegraphic relay which instead of having a common soft iron armature is provided with one permanently magnetized.

Polarizing Current.—A current which causes polarization.

Pole Armature.—An armature whose coils are wound on separate poles projecting radially all around the periphery of its central hub or disc, or projecting internally from a ring-like frame, their ends facing the field magnet.

Pole Changer.—An automatic vibrating or oscillating contact-breaker or switch which, when it moves, reverses the direction of a current from a battery or any other current source—whose direction is fixed—as such current passes through a conductor.

Pole-Pieces of Dynamo or Motor.—The terminations of the cores of electro-magnets, or of permanent magnets, these terminations having various shapes, sometimes quite large as compared with the core proper of the magnet.

Pole Shoe.—An iron or steel plate constituting the pole-piece of a field magnet upon which it is mounted, and employed sometimes to support a field coil.

Pole Tips.—(See polar tips.)

Poles of Magnetic Intensity.—The location of highest magnetic force on the surface of the earth; one such pole being in Siberia, another in about latitude 52 degrees N., longitude 92 degrees W.

Polishing Bob.—A disc of hard wood having on its periphery a rim of leather serving when rapidly rotating upon a shaft, and by means of fine emery to polish articles preparatory to electro-plating.

Polycyclic System.—A mutiphase system.

Polyphasal Coupling of Magnetic Circuits.—The interlinking of magnetic circuits which are traversed by polyphase magnetic fluxes.

Polyphase.—Having many phases. Having more than one phase.

Polyphase Alternator.—An alternator which furnishes polyphase currents.

Polyphase Apparatus.—Apparatus which is worked by polyphase currents.

Polyphase Armature.—An armature which is wound in a manner to produce polyphase currents, or which is worked by them.

Polyphase Asynchronous Motor.—An asynchronous motor which is worked by multiphase currents.

Polyphase Currents.—A term signifying groups of alternating currents which constantly differ from each other by a constant proportion of periods of alternation, and adapted for operating polyphase motors.

Polyphase Dynamo.—A polyphase generator.

Polyphase Generator.—An alternator which sends out

alternating currents having a fixed difference in phase.

Polyphase Inductor-Alternator.—An inductor-alternator adapted to the production of polyphase currents.

Polyphase Motor.—A motor driven by polyphase currents.

Polyphase Synchronous-Motor.—A synchronous motor driven by polyphase currents.

Polyphotal Arc-Light Regulator.—A regulator adaptable for service in series connected arc lamps.

Poncelet.—A term signifying a unit of operative energy equal to 100 kilogramme-metres per second.

Porcelain.—A fine variety of earthenware valuable for insulating purposes.

Porcelain Insulator.—An insulator made of porcelain and used to support a wire.

Porosity.—The quality or state of having pores or interstices.

Porous Cell.—A jar of pipe clay, unglazed earthenware or other material of like character used in voltaic cells to keep two liquids separate and at same time permit electrolysis and electrolytic induction.

Porret's Phenomenon.—An increase in the diameter of a nerve produced by the positive pole of a voltaic circuit in contact with the tissue and in proximity to the nerve while the other pole is connected to another part of the body.

Portable Igniting Device.—A portable device employed for electrically lighting gas or charges of powder and other explosives used in mining.

Portable Tachometer.—A speed indicator which is portable.

Portative Power of Magnet.—The power possessed by a magnet to sustain a weight by the attraction of its armature.

Positive Brush of Dynamo.—The brush out of which passes the current generated in the armature of a dynamo.

Positive Brush of Motor.—The brush connected with the positive terminal of an operating source.

Positive Bus-Bars.—Bus-bars connected with a dynamo's positive terminal.

Positive Carbon.—That carbon contained in a voltaic arc and which delivers the current into the arc.

Positive Currents.—The currents which deflect the needle to the left, in the single needle telegraph system.

Positive Electrode.—The electrode which is connected with the positive pole of a source.

Positive Feeders.—The lead or wire in a set of feeders which is connected to the positive terminal of the generator.

Positive Plate of Storage Cell.—A storage cell plate which by the action of a charging current becomes coated with a layer of lead peroxide. The plate of a storage cell which becomes the positive pole of the cell on discharging by reason of being connected with the positive terminal of a charging source.

Positive Plate of Voltaic Cell.—A voltaic couple's electro-positive element. The plate, which constitutes

the negative pole of a cell above the surface of the electrolyte.

Positive Pole.—The north pole in a magnet, or the pole from which lines of force are assumed to emerge into the air.

Positive Rotation.—A rotation the motion of which is from left to right.

Positive Side of Circuit.—The side of a circuit which, if an observer stood girdled by the current with his head in the positive side, he would see the current pass around him from his right toward his left hand.

Positive Wire.—The wire connected with the positive pole of any arrangement or device which will produce an E. M. F.

Potential Dynamometer.—A device or apparatus adapted for measuring electric potential differences.

Potential, Electric.—The ability to perform electric work.

Potential Energy.—The capacity for doing work. Potential chemical energy latent in an elementary substance which, in combination with some other element for which it has an affinity, becomes liberated as actual energy for the performance of work.

Potential Galvanometer.—A galvanometer which is wound with fine German silver wire in order to obtain high resistance and used for determining potential difference.

Potential Gradient.—A line which represents the drop of potential in a circuit.

Potential Conductors.—The ratio between the volume of current in a conductor and its capacity. The

property possessed by a conductor to perform electric work when approached by an electric charge.

Power.—Activity. The rate of activity, of performing work, or of exerting energy; the practical unit of electric power; being the volt, ampere or watt, equal to 10 ergs per second.

Power Cable.—A cable through which electric power is transmitted.

Power Circuits.—Circuits through which electric power is transmitted.

Power Factor.—The relation, in an alternating-current, conductor or circuit, of the true watt to the apparent volt amperes.

Power-Factor of Transformer.—The relation, under a specified load, of the watts taken up by a transformer to the watts delivered from the transformer.

Power Generator.—An alternating current generator employed at a telephone exchange.

Power-House.—A house in which the plant of an electric power system of distribution is located.

Power-Meter.—A watt-meter.

Power-Wire of Monocyclic System.—In a monocyclic system a wire which furnishes the current to operate triphase electric motors.

Practical Solenoid.—A term employed to distinguish the ordinary from the ideal solenoid.

Practical Units.—A system of units based on the absolute system of units, except that multiples of the original fundamental units of lengths, mass and time have been taken as the base of the new system,

and they consist of the centimetre-gramme-second units.

Presbyopic.—Far-sighted.

Pressure, Electric.—Electro-motive force or potential difference; an inaccurate term.

Pressure Equalizer.—A device which maintains automatically a uniform pressure, under different loads, at the terminals of a storage battery. A device used in a system of electric distribution to regulate the pressure and keep it uniform.

Pressure Indicator.—An instrument which serves to indicate the electric pressure in a circuit. A voltmeter.

Pressure Recording-Gauge.—A recording voltmeter. A recording steam or water gauge.

Pressure Wires.—Copper wires communicating with a central station from junctions between the feeders and the mains and serving to indicate at central station the pressure on the mains.

Primary Battery.—A single electric source comprising several separate primary cells.

Primary Coil Transformer.—The coil which receives the current to be transformed.

Primary Currents.—Currents which pass through a primary circuit.

Primary Cut-Out.—A cut-out used in a primary circuit.

Primary Electric Clock.—A name signifying “controlling clock.”

Primary Electromotive Force.—Electromotive force applied to a transformer’s primary coil.

Primary Fuse Box.—A fuse box used in a transformer’s primary circuit or in that of an induction coil.

Primary Impedance.—The impedance of a transformer's primary coil or that of an induction machine.

Primary Plate of Condenser.—The plate of a condensing transformer which, when containing the inducing charge, induces in the secondary plate a charge of different potential.

Prime Magnetic Flux.—Magnetizing force and which is different from magnetic induction. The flux, which the prime magneto-motive force produces in a ferric circuit; and differing from the induced magneto-motive force.

Prism Error of Compass.—An error occurring in a compass arising from an incorrect disposition of the prism as referred to the compass card.

Probe, Electric.—A surgeon's probe contrived to indicate by the closing of an electric circuit the presence of a bullet or any other metallic object in the human body.

Process of Carbonization.—A method by which suitable materials are carbonized.

Production of Cold by Electricity.—The reduction of temperature at a thermo-electric junction attending the absorption of energy, which follows the passage of an electric current across the junction in a certain direction.

Production of Electricity by Light.—Electric difference of potential effected by the action of light.

Projecting Power of Magnet.—The distance at which attraction or repulsion is effected by a magnet.

Projection Arc-Lamp.—An arc lamp adopted to project for searchlight purposes.

Projector Electric.—A projector at whose focus an electric arc light is employed.

Projection Armatures.—Armatures in which depressions are made of sufficient width to leave a projection in the armature surface, therein differing from the narrow slotted tunnel armatures.

Prony Brake.—A device used to measure the power applied to a rotating shaft by applying a clamping device to the shaft or pulley. A dynamometer.

Proof-Plane.—A small conductor carried at the end of an insulating handle and used to collect electricity by contact from objects electrostatically charged, the charge received being then measured.

Proportional Coils.—Pairs of resistance coils, representing ordinarily a resistance of 10, 100 and 1,000 ohms each, serving as proportional arms for a bridge or a balance; used in the box of Wheatstone's bridge.

Proposed Definition for 2,000 Candle-Power Arc.—An arc whose maintenance will require 450 watts.

Propulsion, Electric.—A term signifying propulsion by electric power.

Protection of Metals, Electric.—A method by which metals are prevented from corroding, and which consists of exposing a protecting metal to the corroding fluid, which, by forming with the surrounding fluid the positive element of a voltaic couple, is subjected alone to the corrosive action, and thereby protects from corrosion any metal with which it has been placed.

Protection of Ship's Sheathing, Electric.—A method for preventing the corrosion from water of the cop-

per sheathing of a ship by fastening pieces of zinc to it.

Protective Sheath.—A sheath of copper introduced between the primary and secondary circuits of an alternating current transformer, and, being connected to the earth, it becomes grounded if the primary coil loses its insulation before it can leak to the secondary, thus protecting the secondary circuit from the high electro-motive force of the primary circuit.

Public Supply Instruments.—Electric meters which serve to register the supply of current to consumers.

Pull.—A switch for closing a circuit when pulled as distinguished from a push button.

Pulley.—A wheel with a broad rim, mounted on a shaft, to which the driving power is imparted by means of a belt.

Pull-Off.—An insulator which serves to hold the trolley wire in its proper place over curves in the track.

Pulsating Motor.—The early type of motor depending upon reciprocating motion in its armature as distinguished from the ordinary rotary motion.

Pulsatory Magnetic-Field.—A field produced by pulsating currents and by induction; such field can produce an alternating current.

Pumping of Alternating-Current Dynamo.—A pulsatory movement resulting from imperfect synchronism and observed in synchronously-running alternating current generators or motors.

Pumping of Electric Lights.—A term signifying a periodical loss or gain in the brilliancy of lights.

Pupillary Photometer.—A photometer whose action is contingent upon the decrease in diameter of the pupil of the eye, which is exposed to the intensity of the light.

Push.—A push button.

Push-Button.—A switch serving to close a circuit by means of pressure upon a button.

Putting Straight.—The restoration to their proper conditions of wires that have been crossed.

Pyrogravure.—A process of decoration by the means of a tool, heated electrically or by other means, and applied to copper, glass or wood.

Pyro-Magnetic Generator or Dynamo.—An apparatus by means of which electricity is generated directly from the heat obtained from burning fuel.

Pyro-Magnetic Motor.—A motor operated by the alternation of an armature's or other moving member's attraction and release, as such member, or section of it, becomes more or less paramagnetic by heat.

Pyro-Magnetism.—The development, by heat, of new magnetic properties or alteration of magnetic sensibility in a body.

Pyrometer.—An instrument for measuring temperatures too high for the capacity of thermometers.

Pyrometer, Electric.—An instrument for measuring high temperatures by the variations in electric resistance exhibited by a platinum wire exposed to the heat which is to be measured.

Q.

Quad.—An abbreviation for quadruplex; an abbreviation for the quadrant, used as the unit of inductance.

Quadrant.—A length, approximately an earth quadrant and equal to 10.9 centimeters; sometimes applied to the unit of inductance. The henry.

Quadripolar Dynamo or Generator.—A multipolar dynamo which has four field magnet poles.

Quadripolar Field.—A field created by four magnet poles.

Quadruplex Circuit.—A single circuit capable of having four messages transmitted over it simultaneously, two in one direction and two in the opposite.

Quadruplex Telegraphy.—A system of telegraphy providing for the transmission of messages over a quadruplex circuit.

Quadruplex Telephony.—The transmission simultaneously of four telephonic messages, two in one direction and two in the opposite.

Quadruplex Re-entrant Armature Winding.—An armature having four separate and independently re-entrant windings.

Qualitative Analysis.—Analysis for determining the constituent elements of a compound without regard to quantity.

Quality of Radiation.—The quality of radiation as referred only to its frequency and amplitude of vibration.

Quantitative Analysis.—That method of analysis which determines the proportional quantity of each of the elements which make up a compound.

Quantity Efficiency of Storage Battery.—The relation existing between the number of ampere-hours received from a storage battery to the number supplied to the battery in charging it.

Quarter-Phase.—The separation by a quarter period of two alternating quantities.

Quarter-Phase Armature.—An armature of the poly-phase class, serving to produce quarter-phase currents.

Quarter-Phase Bar-Winding for Armature.—A bar-winding used in a quarter-phase generator's armature.

Quega.—A prefix meaning a quintillion.

Quick-Break.—A break in a current effected by the employment of a quick-break switch.

Quick-Break Switch.—A switch by means of which a circuit is quickly broken.

Quickening Solution.—A solution into which articles that are to be electro-plated are dipped after cleaning immediately prior to their immersion in the plating bath. A solution of salt of mercury.

Quiet Arc.—An arc devoid of noise.

Quiet Commutation.—Sparkless commutation.

Quivering of Magnetic Field.—The periodic motions of magnetic flux resulting from the successive commutations of the advancing armature coils and manifested under the leading pole-piece of a generator or the trailing pole-piece of a motor.

R.

- R. P. M.**—An abbreviation meaning revolutions per minute.
- Raceway.**—A space along the length of a conduit provided for the ready introduction or removal of conductors.
- Racing of Dynamo.**—Rapid acceleration of speed in a dynamo-electric machine following the abrupt removal of its load, as, for instance, when a belt breaks.
- Racing of Motor.**—Rapid acceleration in the speed of an electric motor, following the abrupt removal of its load.
- Rack-Rail-Incline Electric Railway.**—A method by which a trolley car is hauled over a steep grade by means of a rack-rail used as in the ordinary incline system.
- Radial Truck.**—A support of a triple-truck design for the body of a car, the car resting on the end truck centers in a manner which enables the trucks to turn freely and carry the middle truck between them.
- Radially-Laminated Armature.**—An armature core in which the iron is made up of light discs, supported on the shaft in a suitable manner.
- Radiate.**—To emit or send out in direct lines from a point or points; as, to radiate heat.
- Radiation Constant.**—That heat which is lost by radiation in a given length of time when the temperature of the body from which the heat is radiated

is one degree higher than that of the surrounding atmosphere.

Radiation of Magnetic Flux.—The issue of magnetic flux from a magnet's north seeking pole.

Radiator, Electric.—A radiator electrically heated employed for heating rooms and other spaces.

Radiograph.—A picture taken by the X-rays process.

Radiometer.—An instrument which comprises four vanes poised, on an axis, thus enabling it to rotate freely, and enclosed in a sealed and glass vessel almost completely exhausted. The Crookes radiometer.

Radiophonic Sounds.—Sounds produced by the direct action of radiated energy on certain bodies.

Radophony.—The production of sound by the intermittent action upon a body of a beam of light.

Rail-Bond, Electric.—A device employed to obtain good electrical contact between the ends of rails in order to reduce to a minimum the resistance of the joints of the rails, which are used as a portion of the return circuit.

Rail Bonding.—Connecting rails in such manner as to obtain close electric contact.

Railroad, Electric.—An electric railroad, employing electric motors placed upon cars or locomotives by means of which they are propelled.

Railway Current-Controller.—A style of switchboard serving to govern the output of an electric power house. A motor-controller employed on railroads to start, stop and modify the speed of cars.

Railway Generator.—A dynamo electric machine em-

ployed in systems of electric railroads to generate the current required for operation.

Railway Line-Crossing.—Methods adopted to support trolley wires where two or more cross one another at points along the line.

Railway Motor.—An electric motor by means of which electric street and trolley cars are propelled.

Railway Return Circuit.—A grounded circuit used in trolley systems for ground return. The negative side of the system usually.

Range Indicating System.—A telegraphic system employed on men of war whereby the distance of the targets is determined by the range finder and indicated at the guns.

Rated Candle-Power.—Nominal candle-power.

Ratio Proportionate Arms of Bridge.—A term applied to the proportionate arms of a Wheatstone bridge.

Ratio of Transformation.—The relation existing between electromotive force produced at an induction coil's secondary terminals and that which is impressed on the primary terminals.

Ray.—A line of light or heat or other form of energy proceeding from a radiant or reflecting point.

Reactance.—The product of the induction by the angular velocity of the sinusoidal current which passes through it. In a simple-harmonic current circuit, a quantity, the square of which added to the square of the resistance, gives the square of the impedance.

Reaction Coil.—A coil of high self induction employed to resist the intensity of, or "choke" alternating currents, and formed of insulating wire wound

upon a laminated or divided iron core, and so shaped as to afford a closed magnetic circuit.

Reaction Motor.—Induction motor.

Reaction Principle of Dynamo-Electric Machine.—A principle of the dynamo current generator providing for the reciprocal action of the current produced in the armature coils and the field coils of a continuous-current dynamo-electric machine, whereby one strengthens the other until the current very soon reaches its full strength.

Reaction Telephone.—A style of telephone equipped with two coils of insulating wire, one being placed on the disc and the other on the magnet pole, the coils reacting upon each other, thus producing a stronger effect.

Reactive Coil.—Reaction coil.

Reactive Drop.—The drop occurring in a circuit resulting from reactance, differing thereby from the drop due to ohmic resistance.

Real Efficiency of Storage Battery.—In a storage battery the relation existing between the number of watt-hours taken out of the battery and those put into it when charging. The energy efficiency of a storage battery as distinguished from its quantity or ampere-hour efficiency.

Rebabbitting.—Renewing the Babbitt metal on machine bearings.

Recalibration.—The recalibration of an instrument.

Receiver.—An instrument for receiving messages in telephony and telegraphy and also a term applied to the receiving instrument of a gramophone and graphophone.

Receiving End of Line.—The end of a line where the currents are received as opposed to the end at which they are transmitted.

Receiving Magnet.—Any magnet which forms part of the receiving apparatus employed at the receiving end of a telegraph or telephone line. A relay.

Receptacle.—A device for the reception of an attachment plug and used in incandescent lighting.

Receptive Device.—A device serving to receive, translate, utilize or transform energy.

Reciprocal.—Quantities which, multiplied together, produce unity.

Reciprocating Motor.—A motor having a reciprocating action or one moving first in one direction and then in the opposite.

Recoil Kick or Disruptive Discharge.—A reaction resulting from a disruptive discharge.

Recorder Ammeter.—An ammeter which makes a permanent record of its indications.

Recording Meter.—An electric meter which records its indications.

Recording Voltmeter.—A voltmeter which makes a permanent record of its indications.

Recording Wattmeter.—A wattmeter which records its indications.

Rectangular Curve.—A curve with outlines approximately conforming to a rectangular shape.

Rectification of Alcohol, Electric.—The process of rectifying or purifying alcohol by electricity.

Rectified.—Commutated—Changed as regards direction.

Rectified Currents.—Commutated Currents.

Rectifier.—A commutator.

Rectifying Commutator.—A commutator that commutes alternating into direct currents.

“Red” Magnetism.—A distinguishing term suggested by the two-fluid theory of magnetism and applied to the magnetism at the north pole of a magnet.

Redressed Currents.—Currents changed, as regards direction or directions by a commutator.

Reduction Gear.—A gear serving to reduce the speed of a street car below that of its driving motor.

Re-Entrant Armature-Windings.—Armature-windings which lead back to their point of departure.

Refining Electric.—The electrolytic refining of metals.

Reflect.—To throw back light, heat or the like from a surface.

Reflecting Galvanometer.—A galvanometer whose needle deflections are read by means of an image which a reflected light from a mirror projects. A mirror galvanometer.

Reflection.—The throwing back of light, heat or the like from a surface at an equal angle to that at which it strikes it.

Refract.—To break the natural course of rays in an elastic medium, as for instance the refraction of the rays of light as they pass from a rare into a dense medium.

Refraction.—The change in the direction of a ray of light, heat or electro-magnetism when it enters obliquely a medium of a different density from that through which it has previously moved.

Refractory.—Difficult of fusion. Not readily yielding to heat; said especially of metals.

- Regenerative Cell.**—A cell restored to the performance of its proper functions of producing currents by a process of charging.
- Registering Photometer.**—A photometer which registers the chemical action of light as distinguished from one which registers the photometric action.
- Regulating Cell for Storage Battery.**—A counter-electromotive force cell.
- Regulating Lamp Socket.**—A socket provided with a device having a switch attached and which serves to vary the brilliancy in an electric incandescent lamp.
- Regulation of Dynamo.**—The maintenance of constancy in the current or pressure of a dynamo by proper adjustment.
- Regulation of Motor.**—The maintaining constant of the speed or the torque, or both, of a motor by proper adjustment.
- Regulation for Dynamo.**—A device serving to regulate a dynamo.
- Regulator for Motor.**—A device serving to regulate a motor.
- Regulator Magnet.**—A magnet designed to effect any required regulation automatically. A magnet whose armature moves in such manner as to automatically shift the commutator brushes to a position on the commutator which insures the preservation of the current constant, notwithstanding any variation of resistance in the external circuit.
- Relative Inductivity.**—The relation existing between the inductivity of a medium and that of a vacuum.
- Relay.**—A telegraphic receiving instrument which

opens and closes a local circuit by movements caused by the impulses of currents received.

Relay Bells.—Bells connected to a main line by relay connection for acoustic telegraphy. The system has practically fallen into disuse.

Relay Contact.—A term often used for a type of electromagnetic instrument which serves to complete a local circuit on the passage of a current.

Relief Photometer.—A form of photometer in which two divisions of the screen are placed at right angles to each other and the whole screen then appearing as a single plane illumined surface, the quality of illumination is easily determined.

Reluctance.—Magnetic resistance.

Reluctivity.—The reluctance of a cube of matter the edge of which in length measures one centimeter.

Reluctivity Constants.—Constants which give the reluctivity of iron or steel when applied, in accordance with a formula, to their magnetic force.

Remanent Flux.—Residual magnetism.

Remanent Magnetism.—A term used for residual magnetism. The magnetism in a core after the exciting current ceases to flow.

Repeating Relay.—In telegraphy a relay for repeating the signals through a second line.

Repeating Sounder.—In telegraphy a sounder which repeats a message into another circuit.

Repeating Telegraphic Station.—A Station on a long telegraphic line occupying a position between the sections into which the line is divided and at which the currents received on one section are repeated into the other section by means of a repeater.

Repeating Telephone Coil.—An induction coil with two equal windings, each one being connected to a telephone circuit, thus obtaining close inductive association.

Repulsion, Electric.—The tendency which exists between two bodies charged alike, to mutually repel each other.

Repulsion Motor.—A motor receiving its power through the mutual repulsion of electric charges. An alternating-current motor receiving its power through the mutual repulsion of electric charges. An alternating-current motor, in which, by means of a commutator and brushes, the armature is provided, for the time being, with short circuited windings.

Residual Atmosphere.—The minute quantity of air or other gas which is left in a vessel or chamber after it has been practically exhausted by a pump or otherwise.

Residual Charge.—The charge left in a Leyden jar after disruptive discharge.

Residual Magnetic-Flux.—The residual magnetism remaining after magnetic induction ceases, expressed in lines of force per square centimeter. Magnetic flux left in a magnetic circuit after the disappearance of the magnetizing force.

Resilience.—Elasticity.

Resin.—A solid inflammable substance, of vegetable origin; a non-conductor of electricity.

Resistance.—That property of an electric conductor by which it opposes the passage of an electric current.

Resistance Box.—A term applied to a box which contains graduated resistance coils.

Resistance Bridge.—Electric balance. Wheatstone's balance.

Resistance Coil.—A coil of wire or other conductor having the capacity to offer resistance to the flow of electricity. A coil of wire employed to measure an unknown resistance by virtue of its own known resistance.

Resistance Losses.—Losses caused by friction in the transmission of energy. Losses in a system of electrical distribution occasioned by resistance.

Resistance of Human Body, Electric.—Ohmic resistance opposed to the passage of an electric discharge or current by the human body.

Resistance of Human Skin, Electric.—The ohmic resistance offered by the human skin to the passage of an electric current.

Resistance of Voltaic Arc.—The resistance which a voltaic arc offers to the passage of a current.

Resistance Slide.—A rheostat provided with a sliding contact by means of which the several resistances or coils are put in or taken out of a circuit.

Resistants.—Bodies capable of resistance.

Resisting Torque.—The torque required by a motor to enable it to move. The torque of retarding forces.

Resonator, Electric.—An open electric circuit of small dimensions whose ends are nearly in contact and which, when subjected to the influence of the electric resonance, a spark produced by the inductance of the resonator passes across the gap.

Rest.—A cessation from motion.

Resultant.—A force which is the joint effect of two or more forces.

Resultant Induction.—The magnetic induction in a dynamo's armature or any mass of magnetized material which is the resultant of the inducing effect of several components of magnetic induction.

Resultant Magnetic Field of Dynamo.—The magnetic field which is the product of both the field produced by the field magnets and the current passing through the armature coils.

Retardance.—The limitation of a telephone circuit with respect to the transmission of sound and which is equal to the total ohmic resistance and total capacity of the line.

Retarding Coil.—Choking Coil.

Retarding Disc.—A disc of copper mounted on a rotating shaft so arranged as to cut magnetic flux, which results in the retardation of its rotary speed.

Retardation Coil.—Choking Coil. Retarding coil. Induction coil.

Retentiveness.—That property which enables steel to retain its magnetism.

Retentivity.—The quality of retaining magnetization or of resisting demagnetization.

Retort Carbon.—Carbon deposited from decomposition of the hydrocarbons and little used for electric purposes owing to its extreme hardness.

Return Circuit.—That portion of a circuit by which an electric current returns to the generator.

Return Feeders.—The feeders along which the current passes on its way back to a central station. The return feeders on a trolley line which are connected with the track. Ground feeders. Negative feeders.

Return Ground.—The portion of the ground which serves as a return. The ground-return.

Return-Signal Call-Box.—A call-box which answers a signal.

Reversal.—A change of direction.

Reversal of Phase.—A change in the phase of a current which is caused either by the reversal of the current or of the conductor in which it is generated.

Reversible Electric Motor.—A motor, the direction of whose motion can be easily reversed. A motor constructed in a manner to render its operation as a generator practicable.

Reversibility of Dynamo.—A dynamo, which when traversed by an electric current, can operate as a motor.

Reversing.—To alter a direction to its opposite.

Reversing a Current.—Altering a current's direction.

Reversing Controlling-Box.—A controlling box by means of which the direction of a motor's rotation can be reversed.

Reversing-Gear of Electric Motor.—Apparatus by means of which a motor's direction of rotation can be reversed.

Reversing-Handle of Car Controller.—A switch handle attached to a car controller and serving to change its direction of motion. The handle of the emergency switch.

Reversing Key.—A key which, when inserted in the circuit of a galvanometer, obtains deflections on either side of its scale. A key whose function is, when inserted, to reverse the current given out to a circuit.

- Rheostat.**—An apparatus serving to change the resistance without opening a circuit. An adjustable resistance.
- Rheostat Frame.**—A perforated frame in which the several resistances of a rheostat are enclosed.
- Rheostat Panel.**—A switchboard panel to which the circuits of the rheostat are connected.
- Rhumbs of Compass.**—The points of the compass.
- Ribbon Conductor.**—A conductor resembling a ribbon in shape.
- Ribbon Copper.**—A copper conductor resembling a ribbon in shape.
- Right-Handed Armature Winding.**—A dextrorsal winding of an armature core.
- Right-Handed Dynamo.**—A dynamo which rotates right-handedly when observed from the pulley end.
- Right-Handed Helix.**—A helix on which the convolutions of wire are wound in a right-handed direction—in a clock-wise direction.
- Right-Handed Motor.**—A motor designed to run in a direction, when viewed from the pulley end, corresponding to the direction followed by the hands of a clock.
- Right-Handed Solenoid.**—A right-handedly wound solenoid.
- Ring Armature.**—An armature whose core is ring-shaped.
- Ring Clutch.**—A clutch, ring-shaped, and serving to clutch the lamp-rod of an arc lamp when the ring gets out of horizontal position.
- Ring Clutch for Arc Lamp.**—A clutch resembling a ring in shape, and which encircles the lamp rod, holding

it firmly when in an inclined position, but allowing it to drop when in a horizontal position.

Ring-Connected Generator.—A generator whose armature is wound in such a manner as to provide for the connection of corresponding points to ring conductors, thereby equalizing the current distribution and flux around the armature.

Ring-Magnet.—A bar evenly magnetized and made into a ring.

Ring-Off.—A term applied to the signal given by a subscriber when he has finished using the telephone.

Risers.—Wires which run vertically from floor to floor in a building in order to furnish the different floors with current from the service wires.

River Cable.—A sub-aqueous cable adapted for use in rivers.

Riveted Railway-Joint.—A rail-joint effected between two rails by means of heavy fish plates, riveted to the end of each rail.

Roaring of Arc.—A roaring noise accompanying the formation of a strong voltaic arc and due to too close proximity of carbons.

Rocker Arms.—Arms projecting from a rocker and each one carrying one of the brush holders.

Rocker-Arm Circle.—The movable piece mounted concentrically with the commutator and carrying the rocker arms and brush holders, and which, by being moved, adjusts the brushes for proper lead.

Rod-Clamp.—A clamp used in the lamp rod of an arc lamp.

Rod Clutch.—A device serving to clutch the carbon rod in an arc lamp.

Roentgen Effects.—Effects obtained by means of the Roentgen or X-rays.

Roentgen Radiograph.—A term proposed for radiograph.

Roentgen-Ray Screen.—A screen whose surface is covered with fluorescent material for the purpose of receiving and displaying a Roentgen image.

Roentgen-Ray Transformer.—A transformer of alternating current and adaptable for operating a Roentgen-ray tube.

Roentgen-Ray Tube.—A glass vessel containing a high vacuum and sealed hermetically with electrodes passing through it.

Roentgen Rays.—A peculiar form of radiation discovered by Roentgen, and which is emitted from that portion of a high vacuum tube upon which the cathode rays fall.

Roget's Spiral.—A cylindrical helix of wire suspended by one end, the other end dipping into a mercury cup, an active circuit being connected, one terminal to the upper end, the other to the mercury cup, thus bringing the apparatus in series into the circuit, while the current as it flows causes the coil to shorten, each spiral attracting its neighbor; thus breaking the circuit by the lower end being drawn out of the mercury cup; and when the current is cut off the coils do not attract each other, and the ends drop into the mercury cup again, and in this way the circuit is alternately opened and closed. An automatic contact breaker.

Rosette.—An ornamental device placed in a wall or ceiling and equipped with service wires in order

that an electric lamp or an electrolier may be easily attached.

Rosette Cut-Out.—A rosette having a cut-out.

Rotary Converter.—A motor and dynamo combined whose function is to transform a current of any kind—high or low voltage, alternating or continuous—into any other kind of current desired; the watts taken in being in excess of those put out.

Rotary Current.—A term used signifying polyphase currents which can produce a rotary field.

Rotary-Field Induction Motor.—An induction motor which is operated by causing the field coils to be excited one after another successively around the periphery of the armature.

Rotary-Magnetic Field.—A field resulting from a rotary current; a magnetic field.

Rotary Magnetism.—Magnetism which a rotary magnetic field produces.

Rotating Brushes of Dynamo.—Disks of metal which rotate around the periphery of a commutator thereby translating the current, and used sometimes instead of the ordinary brushes.

Rotating Current.—A term signifying the current which is the product of a combination of alternating currents, the phases of which are definitely displaced as referred to one another; a multiphase current.

Rotating-Current Transformer.—Rotary-current transformer.

Rotor.—The rotating part of an induction alternating electric machine.

Rubber Tape.—A rubber insulating adhesive tape.

Ruhmkorff Coil.—A common induction coil with circuit breaker, used with constant and direct current. A coil in which a high voltage is induced in the secondary coil. A step up transformer with a circuit breaking attachment.

Rumble.—A hollow cylinder into which are placed small articles that are to be polished preparatory to electro-plating, the cylinder being rotated by mechanical power, the articles are kept in constant motion, and the desired effect is obtained by their attrition against one another or against other hard objects which may be contained in the cylinder for that purpose.

Running Position of Street-Car Controller.—The position of the switch handle while the current which keeps the motors in rotation is being supplied, and a position differing from that maintained while the current is cut off.

Running Torque of Motor.—The torque which a motor exerts while running, and to be distinguished from the starting torque.

S.

S. P. Cut-Out.—An abbreviation meaning single pole cut-out.

Safe Carrying Capacity of a Conductor.—The strength of current which a conductor will carry without overheating.

Safety-Catch.—Safety fuse.

Safety-Catch Holder.—Safety fuse holder.

Safety Device for Arc Lamps or Series Circuit.—An

automatic device by the operation of which a path for a current around a lamp or other defective device in a series circuit is made, thereby obviating the opening of a whole circuit.

Safety Fuse.—A wire or any other suitable form of metal which is easily fusible and capable of carrying an ordinary current without fusing, but which will fuse under an unusually strong current and automatically break the circuit.

Safety Fuse-Block.—A block serving to receive a safety fuse.

Sag of Conductor or Line Wire.—The sag of an overhead wire or conductor suspended between two points of support.

Salimeter.—A hydrometer by means of which the density of saline solutions is measured.

Saline Creeping.—A deposit of salts on the walls of solids immersed in saline solutions, effected by efflorescence.

Saline Solution.—A salt dissolved in a liquid.

Sand-Box for Electric Car.—A box containing sand and attached to a car for the purpose of sprinkling the sand over the track, thereby increasing the friction between the wheels and the rails.

Saturated Solution.—A solution which has dissolved as much of a solid as it is capable of dissolving at a given temperature.

Sayers Armature Winding.—An armature winding designed to obtain sparkless commutation by means of additional coils, termed commutator coils, which are exposed to the action of an auxiliary pole and introduced into the main circuit.

Scale Zero.—An instrument zero.

Scarf Joint of Conductors.—A joint effected between the ends of conductors by cutting the ends on a bias and then soldering them together, thereby preserving a cylindrical shape and smooth surface.

Sciagraph.—A name proposed for radiograph.

Scintillating Jar.—A Leyden jar the coatings of which are made by placing small pieces of tin-foil on the glass at certain distances apart, leaving small spaces between them.

Scratch Brush.—A brush of wires or stiff bristles serving to remove all foreign matter from the surface of metallic articles preparatory to electro-plating.

Screen, Electric.—A cage, plate or hollow case composed of a conducting substance and having an earth connection so as to protect from electrostatic influences any object placed inside of it.

Screening Effect of Eddy Currents.—The effect which eddy currents cause in a solid body of iron or steel, and which consists in protecting the interior of the body from the influence of an external alternating magnetic field.

Sea Cell Test.—A circuit test used in submarine electric torpedo work and accomplished by means of a single voltaic cell, the sea water serving as the electrolyte.

Seal of Meter —A seal of lead put on a meter to guard against tampering with the meter after it has been set.

Sealing-In of Filament.—The hermetical sealing of an incandescent lamp between the support of the filament and the lamp chamber.

Sealing-Off of Lamp Chamber.—The hermetical sealing of a lamp chamber by fusing the glass while the lamp is still connected with the pumps.

Search-light, Electric.—An apparatus which produces a powerful stream of light and projects it in any direction, employing a focusing arc lamp, which, provided with large carbons, is enabled to use a heavy current; and the lamp is so situated as to project the greater part of the light onto a suitable reflector or lens, thereby concentrating the rays into one immense beam.

Secondary.—A term applied to the secondary coil of a transformer or induction coil.

Secondary Ampere Turns.—The ampere turns in the secondary coil of an induction coil or transformer.

Secondary Battery.—A storage battery.

Secondary Cell.—A storage cell.

Secondary Clock.—A clock in a system of time telegraphy, whose movements are controlled by the current, regulated by the master clock.

Secondary Coil of Transformer.—A transformer's coil which receives energy from the primary coil. The secondary winding of an induction coil or transformer.

Secondary Currents.—Currents produced in a conductor by changes in currents in a contiguous conductor. The currents produced in the secondary circuit of an induction coil or alternating current converter.

Secondary Fuse-Box.—A fuse-box placed in a transformer's secondary circuit or in that of an induction coil.

Secondary Plate of Condenser.—The plate of a condenser which becomes charged by reason of the existence of a charge in the opposite plate.

Secret Telephone System.—A telephone system operated independent of an exchange or an attendant and arranged in such a manner as to enable persons to communicate with each other between any two stations without being heard by any other person on the line.

Section.—The intersection of two superficies, or of a superficies and a solid; in the former case a line, in the latter a surface. A length of conductor insulated from contiguous portions, as observable in trolley systems.

Section Circuit-Breaker.—A magnetic circuit-breaker by which a trolley wire section is controlled.

See-Sawing.—A term which describes the improper synchronization of two parallel connected alternators.

See-Sawing of Parallel Connected Generator.—Improper synchronization existing between generators.

Segment Switch.—A switch in which an arm is pivoted in such a manner as to enable it to describe in its movement the arc of a circle, which is divided into insulated segments.

Selectance.—A quality possessed by resonant electric circuits and by virtue of which they respond to one frequency of alternating current more than to another.

Selective Absorption.—A selected character of absorption of the waves of light, heat, electricity or sound.

Selective Consonance.—A quality possessed by a consonant alternating current circuit by virtue of which it responds to one frequency more than to another.

Selective Resonance.—That quality possessed by a resonant circuit and by virtue of which it becomes selective to a definite frequency of alternating current.

Selective-Signal Pendulum.—A system of selective signaling wherein the receiving bells are each actuated by a single alternating current frequency, and the transmitting frequency is adjusted to agree by changing the length of a pendulum in the transmitter.

Selective Signaling Apparatus.—Individual signaling apparatus.

Selenium.—An elementary substance allied to sulphur, its resistance being very susceptible to the action of light.

Selenium Eye.—A crude imitation of the human eye in which the eyelids are represented by two slides and selenium resistance represents a retina.

Selenium Photometer.—A photometer determining by comparison the intensity of light; the means of comparison being the changes in the resistance of a selenium resistance by successive exposures under like conditions first to the light to be measured, then to a standard light.

Selenium Resistance.—A resistance demonstrated by means of a mass of selenium which, when exposed to the light, experiences a variation of value corresponding to the variations in the intensity of the light.

Self-Acting Make-and-Break.—An automatic make-and-break device.

Self-Aligning Bearings.—Bearings for journals which are devised and adjusted in such a manner as to allow to a small extent an angular movement, which enables them to conform to the surface of the shaft.

Self-Cleaning Contact Key.—A term applied to a key which has a rubbing contact.

Self-Contained Engine or Machine.—An engine or machine containing within itself all its working parts supported on a single solid foundation.

Self-Excitation.—An excitation of a generator's field magnets by the passage of its own current through its own field coils.

Self-Excited.—Excited by its own current.

Self-Excited Alternator.—An alternator the fields of which are self-excited.

Self-Excited Dynamo.—A dynamo the field of which is self-excited.

Self-Excited Series-Wound Continuous-Current Generator.—A continuous-current generator with a series-wound field, whose excitation is due to the current from the generator's own armature.

Self-Excited Shunt-Wound Continuous-Current Generator.—A continuous-current generator with a shunt-wound field, whose excitation is produced by some of the current diverted in its passage from the armature to the external circuit.

Self-Induced Current.—A current which is induced in a circuit by alterations in its own strength attending the opening or the closing of a circuit.

Self-Oiling Bearings.—Bearings employing automatic oilers.

Self-Oiling Journal.—A journal employing automatic oilers.

Self-Registering Tachometer.—A tachometer whose indications of the different speeds of a machine are permanent.

Self-Regulating Dynamo.—A self-regulating generator.

Self-Regulating Generator.—A generator which, by reason of the manner in which it is wound, maintains automatically, notwithstanding any change in the resistance of its load, either a constant-current in the circuit or a constant difference of potential.

Self-Regulating X-Ray Tube.—An X-ray tube which is capable of automatically adjusting the degree of vacuum and controlling consequently the electric pressure at the terminals.

Self-Starting Alternating-Current Motor.—An alternating current-motor provided with the means which enable it to start with any normal load.

Self-Winding Clock.—A clock which automatically winds itself by means of a small electro-magnetic motor which obtains its current from one or several voltaic cells, the whole apparatus being inclosed within the clock's case.

Semaphore.—An apparatus for exhibiting signals and used in the railroad block system.

Semaphore Arm.—An arm of a semaphore capable of being moved about to exhibit the signals which indicate the condition of the block sections with respect to trains.

Semi-Circular.—Pertaining to a semi-circle.

Semi-Period.—A half period; the time consumed by a reversal.

Sensibility of a Galvanometer.—The degree to which the needle of the galvanometer is affected in its deflections by an electric current passing through its coils. The deflection which a definite small current strength causes.

Sensitive Telephone.—A telephone which is capable of performing its functions with less current than that which is usually required in telephone operation.

Sensitive Tube.—A coherer.

Separable Iron Core.—An iron core capable of being separated from the machine of which it is an accessory.

Separate Circuit Dynamo.—A dynamo which is able to furnish the current to a number of separate circuits. A form of self-exciting dynamo.

Separate-Coil Machine.—A machine the armature coils of which are separated from each other mechanically and not interlaced as in another form of machine.

Separate Excitation.—A dynamo-electric machine whose field magnets are excited by a separate coil or winding in the armature put there for that purpose.

Separately-Excited Alternator.—The excitation of the field magnets, effected by external influence.

Separately-Excited Dynamo-Electric Machine.—A dynamo-electric machine the field coils of which are excited separately.

Separately-Excited Field.—The field of a dynamo supplied with its magnetizing current by a source outside.

Series and Magneto Dynamo-Electric Machine.—A dynamo compound wound, in which the field winding on the field magnets is excited by the armature of a magneto-electric machine with which it is connected.

Series-and-Separately-Excited Dynamo-Electric Machine.—A compound-wound dynamo which provides for a winding of its field magnet cores with two distinct circuits, one core forming a connection with the field magnets and outside circuit in series, while the other forms a connection with some other source, which causes its individual excitation.

Series-and-Shunt-Wound-Dynamo-Electric Machine.—A compound-wound dynamo whose winding of field magnets consists of two distinct coils, one of which is wound with the armature and outside circuit, in series, while the other is wound in shunt with the armature.

Series-Arc Cut-Out.—A contrivance by means of which a short circuit past a defective lamp in a series-connected circuit is automatically secured, which provides for the undisturbed operation of all the other lamps in case of the failure of any one.

Series Circuit.—A circuit established by an arrangement of the separate sources and electro-receptive devices, which provides that the current produced in the circuit shall pass successively through the entire circuit.

Series-Connected Battery.—A battery consisting of series-connected cells.

Series-Connected Incandescent Lamps.—Lamps which are connected to a circuit in series, a cut-out of some description being employed, so that in the event one lamp should be extinguished the others would continue their efficient operation.

Series-Connected Electro-Receptive Devices.—Electro-receptive devices connected in series to a circuit.

Series-Connected Sources.—Separate sources, acting as single sources, due to the manner in which they are connected in series.

Series-Connected Translating Devices. — Series-connected electro-receptive devices.

Series-Connected Voltaic Cells.—Voltaic cells which possess the ability to act as a single source by reason of the manner in which they are connected in series.

Series Connection.—A number of distinct electric sources, electro-receptive devices, or circuits, connected in such manner as to obtain a passage of the current from first to last in the circuit successively.

Series Distribution.—A distribution of electricity in which the receptive devices are arranged in successive order upon one conductor extending the entire length of the circuit.

Series Dynamo.—A series-wound dynamo.

Series Field-Terminals of Motor.—Terminals of a compound-wound motor with which the ends of a series field winding are connected.

Series Incandescent Lamp.—An incandescent lamp adaptable for service in a series circuit.

Series Incandescent Lighting System.—A system of incandescent lighting differing from the multiple system in the manner of connecting; the former system having its lamps connected in series, while in the latter they are connected in parallel.

Series Motor.—A motor adaptable for use in a series circuit. A motor whose field coil winding is in series with the armature.

Series-Multiple.—A series-multiple connection.

Series-Multiple-Controller.—A controller designed for a double motor car and which operates by connecting the motors either in series or in parallel, with or without resistance, its function being to stop, start, vary the speed of the car or vary the torque of the motors.

Series-Multiple Circuit.—A compound circuit where a number of separate groups composed of distinct sources or electro devices, or both, connected in groups in multiple arc, are afterwards connected in series.

Series-Multiple-Connected Sources.—A single source formed by the connection of a number of distinct electric sources, and in this single source the distinct sources are connected in a number of distinct multiple circuits, and these circuits are connected together in series separately.

Series-Parallel Controller.—A series multiple controller.

Series-Winding.—A method of winding a generator or motor, in which one of the commutator-brush connections is connected to the field magnet winding, the other end of the magnet winding being con-

nected with the outer circuit, and the other armature brush being connected with the other terminal of the outer circuit.

Service Block.—A block serving to support and connect service wires.

Service Wires.—Wires connected to the supply circuit or main and which run into a building or structure to supply the current.

Sextipolar.—Having six poles.

Sextipolar Dynamo.—A dynamo with a sextipolar field.

Sextipolar Field.—A field created by six magnet poles.

Shadow Photometer.—A photometer in which the relative intensity of the two lights is estimated by the intensity or strength of the shadows of the same object which they respectively cast.

Shear.—A stress consisting of a lateral projection combined with an equal perpendicular compression.

Shearing Stress.—A stress causing a shear.

Sheathing a Cable.—The covering which is used to protect a cable.

Sheathing Wires.—The wires which are used for the armor of a submarine cable.

Shell of Commutator.—A commutator core apart from the shaft.

Shell Transformer.—A transformer having its primary and secondary coils placed one upon the other, and they are entirely inclosed by the iron core which is wound through and over them.

Shellac.—A vegetable substance of a resinous nature obtained from the juices of certain tropical plants and valuable for its superior insulating qualities and inductive capacity.

Shifting Magnetic Field.—A magnetic field which rotates, its lines of magnetic force varying in position as referred to the magnet pole which emits them.

Shifting Zero.—A zero which changes its position.

Ship Dynamometer.—A dynamometer which serves to indicate the strain on a grappling cable and used on cable ships.

Shock.—A sudden striking against; a collision; a sharp concussion of one thing against another; the violent agitation of the nervous system.

Shock, Electric.—The sudden convulsion of the muscles, with a feeling of pain, occasioned by an electric discharge through the animal system.

Shoe of Contact for Street Railway.—A metallic casting employed on street railroads in connection with a rail-brake and serving to stop the car by the resistance offered, due to its friction upon the rail.

Short Arc System of Electric Lighting.—A system of lighting effected by short voltaic arcs between carbon electrodes.

Short Circuit.—A connection between two parts of a circuit, which connection is a low resistance compared to the intercepted portion; a shunt or by-path. A term used also as a verb, as "to short circuit a lamp"; "to cut out of circuit by a short conductor."

Short-Circuited Conductor.—A conductor having a short circuit connected past it.

Short-Circuiting a Dynamo-Electric Machine.—Employing a short circuit to cut out the outer circuit of a dynamo. Connecting the poles of a dynamo by a circuit of low resistance.

Short-Sightedness.—A defect in the eye which causes objects to appear indistinct when not near to the eye, and which is caused by abnormal convexity of the eyeball.

Shunt.—A connection in parallel with a portion of the circuit in a current circuit.

Shunt.—To establish a connection in parallel with a portion of the circuit.

Shunt-Breaking Resistance.—A resistance employed in a field of a shunt dynamo, so that when breaking its circuit the danger of producing excessive induced pressure may be obviated.

Shunt-Circuit.—A subsidiary circuit in any part of a circuit where the current divides, some of it flowing in the main circuit and some of it through the subsidiary or shunt. A partial circuit connected to two points of another circuit and running parallel with it between the two points.

Shunt-Coil.—A coil in a shunt circuit.

Shunt Dynamo.—A shunt-wound dynamo.

Shunt-Field Terminals of Motor.—The terminals of an electric motor's shunt-field coils.

Shunt for Ammeter.—A shunt coil serving to change the value of the readings of an ammeter and which is connected in multiple with the coils thereof.

Shunt-Rheostat.—A rheostat in a shunt-circuit.

Shunt Turns of Dynamo.—In a shunt-wound or compound-wound dynamo shunt turns signify the ampere turns.

Shunt-Winding.—The winding of a dynamo in which the field magnet winding is in shunt or parallel with the winding of the armature.

Shunt-Wound Dynamo-Electric Machine.—A dynamo electric machine whose commutator brushes have two connections, one set being the terminals of the outer circuit, while the other set are the terminals of the field magnet windings; or, in other terms, the field magnet windings are in shunt or in parallel with the outer circuit.

Shunt-Wound Motor.—A motor the field magnet coils of which are connected in shunt to the armature circuit.

Shunted.—Having a shunt.

Shuttle Armature.—The original Siemens' armature, now in disuse. A form of drum armature having a long, narrow core and its cross section corresponding nearly to the form of an H, the grooves of which are wound full of wire, so that the whole forms almost a perfect cylinder.

Side-Bar Suspension of Motor.—The employment of two light rods mounted on springs, which are parallel to the side frames, for the purpose of supporting the motors in a street railway car truck.

Side Commutator.—The commutator of a dynamo-electric machine which is set on the side of the revolving armature.

Side of Three-Wire System.—In the three-wire system of distribution a term used signifying the positive or negative conductor.

Side Suspension of Motor.—The suspension of motor by means of side bars.

Sides of Three-Wire System.—Those parts of the three-wire system having positive and negative potentials respectively.

Siemens Electro-Pyrometer.—An instrument for the determination of temperatures by the variations in electric resistance in a platinum wire exposed to the heat which is to be measured.

Signal-Service System for Electric Railroads.—A system of electric signals in use on railroads for obtaining information pertaining to the operation of the road, the giving of instructions to trainmen and others and for general communication from stations to trains.

Sight Feeding Oiler.—An oil cup made of glass, by means of which the feeding of oil can be observed.

Silver Bath.—A solution of a salt of silver for deposition in the electro-plating process. An electrolytic bath containing a solution of a salt of silver, with a plate of silver immersed in it and serving as the anode; the article to be plated serving as the cathode.

Silver-Palladium Alloy.—An alloy of silver palladium and other metals, valuable for its non-magnetic properties and much used for certain parts in the works of watches.

Silver-Plating.—Depositing a coat of silver upon the surfaces of base metals by the process of electro-plating.

Simple Arc.—A voltaic arc produced between only two electrodes.

Simple Circuit.—A circuit having a single generator and a single receiver, such, for instance, as a motor or sounder with a single connecting conductor.

Simple-Harmonic Currents.—Currents with a variable flow in strength and duration; a simple harmonic curve serving to represent the quantity of elec-

tricity passing by any section of conductor. Such a character of current that a simple harmonic curve may express the continuous variation of the flow past any area of cross-section of the conductor, or the continuous variations in electro-motive force.

Simple-Harmonic Curve.—The curve which results when a simple-harmonic motion in one line is compounded with uniform motion in a straight line at right angles thereto.

Simple-Harmonic Motion.—Motion of a point back and forth along a line; the motion of a pendulum, as regards its successive swings back and forth, is an example of harmonic motion. Simple-periodic motion.

Simple Immersion.—Electro-plating without a battery and by simply immersing the metal in a solution of metallic salt.

Simple Magnet.—A magnet made of one piece of metal.

Simple Shunt.—A coil designed as a shunt; having no iron core.

Simplex Telegraphy.—A system of telegraphy providing for the transmission of a single message only over the line wire.

Sine Galvanometer.—A galvanometer whose measurements are contingent upon the sine of the angle of deflection produced when the coil and needle rest in the one vertical plane.

Single Brush-Rocker Arm.—An arm holding a single pair of brushes in such a position on a dynamo or motor as to enable them to be shifted easily into the required position on the commutator.

Single-Contact Carbon Telephone.—A style of telephone transmitter with a single contact.

Single-Coil Field Dynamo.—A dynamo with a magnetic field which is produced by a single magnetizing coil.

Single Field-Coil Multipolar Dynamo.—A multipolar dynamo provided with a single field-coil on a single core, and having a number of polar projections.

Single-Fluid Hypothesis of Electricity.—A hypothesis which attributes electrical phenomena to the presence or absence of a single fluid.

Single-Loop Armature.—An armature provided with a closed conducting circuit, with a single loop, and situated in such a manner as to enable it to revolve in a magnetic field and cut its magnetic flux.

Single-Magnet Dynamo-Electric Machine.—A single field-coil dynamo.

Single-Pair Brush Yoke.—A device for holding a single pair of brushes on a dynamo so as to enable them to be shifted easily in the required position on the commutator.

Single Phase.—A phase characterizing that which is present in ordinary alternating currents in a simple alternating current system; being uniphase or monophase differs in this respect from multiphase currents.

Single-Phase Motor.—A monophase motor.

Single-Phase Induction Motor.—An induction motor which is designed to operate on a uniphase alternating current circuit.

Single Phase Synchronous Motor.—A synchronous motor which can be operated by monophase currents.

Single-Phase Transformer.—A transformer designed to supply or transform uniphase currents.

Single-Pole Cut-Out.—A cut-out which breaks the circuit or cuts in only one lead.

Single-Pole Switch.—A switch employed to open or close at only one lead.

Single-Pole Telephone Receiver.—A telephone receiver having but one pole presented to the diaphragm, and in this respect differing from a receiver wherein two poles, each inclosed within a coil, are presented to the diaphragm.

Single-Reduction.—Speed-reducing by a single gear wheel only. A gearing through the medium of which a single reduction of speed is effected as distinguished from a double gearing in which two separate reductions are effected.

Single-Reduction Street-Car Motor.—A street-car motor whose car-axle motion is reduced by means of a single reduction gear, connected with the car axle, as distinguished from a motor which is geared, through two successive gear wheels, with the car axle.

Single-Stroke Electric Bell.—An electric bell which only strikes once each time the circuit is closed.

Single-Throw Switch.—A switch which, in opening and closing a circuit, assumes two positions only.

Single-Trolley System.—A trolley system employing only one overhead conducting wire, the track and ground serving as a return.

Single-Truck Car.—A car whose body is borne on a single truck.

Single-Wire Multiple Telephone Switchboard.—A

switchboard having the jacks all in series in each line and serving to connect ground-return subscribers' lines. A single-cord multiple switchboard employed in telephone service.

Single-Wound Gramme Ring.—A gramme ring having a single winding, in which the number of coils is a multiple of the number of poles, and the number of commutator segments equals the number of poles.

Single-Wound Multiple-Circuit Multipolar Drum-Armature.—A drum-armature so wound as to obtain a multipolar field in a single winding and afford a number of paths between the brushes.

Single-Wound Two-Circuit Drum-Armature.—A drum-armature wound for a multipolar field, with a single winding, and which provides for two circuits or paths between the circuit.

Single-Wound Two-Circuit Multipolar Ring-Armature.
—A ring armature so wound as to obtain a multipolar field, with a single winding, and which provides for but two circuits or paths between the brushes.

Single-Wound Wire.—Wire insulated by winding, or otherwise, with a single layer of material only.

Sinistrorsal Solenoid.—A left-handed solenoid.

Sinusoid.—A curve of sines.

Sinusoidal Alternating Electromotive Force.—Alternating electromotive forces represented as to variations in strength, by a sinusoidal curve.

Sinusoidal Currents.—Simple periodic currents the strengths of which are represented accurately by sinusoids.

Siphon Electric.—A siphon which provides by electrical means for the continuation of the flow of liquid, which has ceased to flow, due to the accumulation of air.

Siphon Recorder.—A recording apparatus in which the inked marks are made on a strip of paper, the ink being supplied by a siphon terminating in a capillary orifice.

Siren.—An acoustic instrument serving to measure the frequency of sound waves.

Six-Wire System.—A distributing system wherein five dynamos are connected to six conductors, and which partakes in general of the character of the three-wire system.

Six-Wire Triphase System.—A system producing tri-phase currents, in three distinct circuits, having two wires each.

Skew Adjustment of Carbons in Arc-Lamps.—A manner of adjusting carbons in an arc lamp, the positive carbon being placed a little in front of the negative carbon, but out of vertical line with it.

Skidding of Car Wheels.—The sliding instead of the rolling of the wheels of a car.

Skin Currents.—Rapidly alternating currents which are confined to the superficial portions of a conductor.

Skin Effect.—A tendency of currents of very brief duration to flow through the outer layers and to avoid the mass of a solid conductor.

Sled.—In a conduit system, a contact for an electric car like the plow, except that it is drawn after the car instead of being pushed ahead.

Sleeve Joint.—A joint obtained by inserting the ends of the wires or electric conductors into a metallic tube or sleeve of sufficient inside diameter to just admit them, and then securing them by twisting and soldering.

Slide Bridge.—A style of Wheatstone's bridge, a single thin wire representing one lateral pair of arms, the other pair representing a resistance which is known and the one to be ascertained; and between the known and the unknown resistance the galvanometer is connected on one side, its connection on the opposite side being moved back and forth until the balance is obtained and the galvanometer strikes zero.

Slide Resistance.—A rheostat the placing and removing of whose separate resistances of coils from a circuit are effected by means of a sliding contact. An instrument used in telegraphy and formed of two slide rheostats divided into 100 parts each, but constituting both together a rheostat in effect, subdivided into 10,000 parts.

Sliding Bed-Plate.—A bed-piece or plate of a belt-driven dynamo which is capable of being moved for the purpose of tightening the belt.

Sliding Contact.—A contact which is connected with one part of a circuit and closes that circuit by being slid over a conductor connected with another part of the circuit.

Slings.—Polished copper wires used in electro-plating, by which the article to be plated is suspended from the negative rod in the depositing tank.

Slip of Induction Motor.—The ratio of difference between the speed of the rotary magnetic field by

which the motor is driven and the speed of the rotor.

Slip of Rotor.—The ratio of difference between the speed of a rotary magnetic field and that of the rotor.

Slipping of Belt.—The speed lost by a revolving belt due to its slipping on its pulley.

Slots on Armature Core.—The grooves in an armature core designed to receive the armature coils.

Slot-Wound Armature.—An armature wherein the windings are sunk in slots.

Slotted Armature.—An armature with grooves designed to receive the wires. An iron-clad armature.

Slotted Conduit.—An underground conduit having a slot which reaches to the surface of the roadbed, by means of which a traveling conductor is enabled to carry off the current from the conductors supported in the conduit.

Slow-Speed Electric Motor.—An electric motor having the capacity to do efficient work at a slow speed.

Slow-Speed Generator.—A generator constructed for the purpose of running at slow speed.

Smashing Point of Incandescent Electric Lamp.—A time when an incandescent lamp has become so discolored that it can no longer render efficient service, and it is considered more economical to break or remove it and put another in its place than to continue its use.

Smee Voltaic Cell.—A zinc-silver couple used with an electrolyte of dilute sulphuric acid.

Smooth-Core Armature.—A cylindrical armature upon whose even surface the coils are wound as distinguished from a slotted or iron-clad armature.

Snap Switch.—A switch so contrived as to give a quick break, a spiral spring being fastened between the handle and the arm in such a manner that when the handle is drawn back to open it—the friction contact holding the bar—the spring suddenly pulls the handle up and the contact is broken.

Snap Welding of Rails.—A welding joint for rails effective by clamping the rails together at their short projections, and then rapidly heating the ends and pressing them together when the required degree of heat for welding has been obtained.

Sneak Current.—A comparatively weak current, entering by accident the circuit of a telephone or telegraph line, and from which no instantaneous bad effect would result; yet, if permitted to continue circulating in a bell or annunciator coil, would generate sufficient heat in a short time to burn it out. A current not strong enough to melt the regular safety fuses, yet of sufficient strength to cause damage if permitted to continue.

Sneak Current Coil.—A coil of German silver wire employed to cut a telephone apparatus out of circuit by melting a drop of fusible metal, when a sneak current or current of dangerous strength has raised the coil to a sufficient degree of heat.

Socket for Electric Lamp.—A receptacle for an incandescent lamp.

Socket Lamp.—A lamp having a socket.

Socket Switch.—A socket key.

Soft-Drawn Copper Wire.—Copper wire which has been first drawn and then softened by annealing.

Soft Porous Cell.—A porous cell baked soft and when employed in a voltaic cell obtains comparatively low internal resistance.

Soldering, Electric.—A process in which heat generated electrically is employed to melt the solder which is used in making the metallic joints.

Soldering Flux.—Any solution serviceable for cleaning the surfaces of articles preparatory to soldering.

Solenoid.—A helical coil of wire, of uniform diameter, representing a cylinder and having one end of the wire bent back and brought through the center of the coil, both ends emerging at the same end. A helical coil of wire of uniform diameter and cylindrical in form.

Solenoid Core.—A core consisting ordinarily of soft iron introduced into a solenoid; and in which position the magnetic flux of the magnetizing current magnetizes it.

Solid Arc-Light Carbon.—Carbon electrodes employed in arc lamps which have no core of softer carbon. A carbon which is solid throughout, thus differing from a cored carbon.

Solid-Back Telephone Transmitter.—A form of microphone transmitter to a great extent used in long distance telephone service.

Solid Thermostat.—A thermostat which depends for its operation upon the expansion of a solid body or upon the unequal expansion of two separate solid bodies.

Solid Wires.—A single wire conductor, thus differing from one composed of a number of parallel wires.

Soluble Electrodes.—Copper, iron or other metallic elec-

trodes which are used in metallic electrolysis and which during electrolysis are converted into metallic salts.

Solution.—The action of an attraction between one or more solids and a fluid when brought in contact, by which the former become themselves fluid, and are diffused through the latter without other change or loss of properties.

Sound.—An effect produced upon the brain through the sense of hearing and caused by the vibrating motion of sonorous bodies.

Sound Wave.—Waves produced in an elastic medium by the vibratory motion of sonorous bodies.

Sounder Resonator.—A sounder whose intensity of sound is increased by resonance; the sounder being placed in a resonant case for that purpose.

Sounding Board.—An elastic board possessing resonant properties and employed in stringed musical instruments.

South Magnetic Pole.—The pole of a magnetic needle which tends to point to the geographical south of the earth.

“Spare” Machine.—An additional machine of any kind held in reserve in a plant to supply the place of any like machine which may accidentally become disabled.

Spark Arrester.—A screen made of wire netting, adjusted around the carbon of an arc lamp above the globe, to obviate the scattering of sparks.

Spark Coil.—A wire coil, insulated and connected with the main circuit, and used in a system of electric gas lighting for lighting gas jets, which is effected

by means of the spark produced by breaking the circuit.

Spark, Electric.—The phenomena observed when a disruptive discharge passes through a gap.

Spark Gap.—A space left between the ends of an electric resonator across which the spark jumps when a certain difference of potential exists between two opposing conductors.

Sparkling Distance.—The distance traversed by the disruptive discharge in its passage through the air space.

Sparkling of Dynamo-Electric Machine.—An injurious production of sparks at the commutator between the brushes and commutator sections of a dynamo electric machine.

Sparkless Commutation.—Commutation of a dynamo which is not attended with sparking at the brushes.

Speaking Wire.—A wire connecting two telephone exchanges for the intercommunication of operators as distinguished from subscribers' wires.

Specific Conductance.—Specific conductivity.

Specific Conductivity.—The reciprocal of specific resistance. The specific resistance of a certain length and area of cross-section of a body as measured by the same length and area of cross-section of a standard substance.

Specific Gravity.—The ration of the weight of a body to the weight of an equal volume of some other body taken as the unit or standard; water usually being taken for solids and liquids, and air for gases.

Specific Heat.—The capacity possessed by any mass or body of matter for heat. The capacity of a body for heat as compared with an identical quantity of some other body taken as unity.

Specific Heat of Electricity.—A proposed term to account for the heat absorbed or given out by un-homogeneous conductors, i. e., heat in purely thermal phenomena and heat in thermo-electric phenomena.

Specific Hysteretic Dissipation.—A loss of energy per unit of volume occasioned by hysteresis in any substance. A loss of energy by hysteresis in a body under specific conditions measured by a like loss in a standard body.

Specific Magnetic Conductivity.—The specific permeability of a body to magnetic flux.

Specific Magnetic Reluctance.—Specific magnetic resistance.

Specific Magnetic Resistance.—Reluctivity.

Specific Magnetism.—A proposed term to express the quotient of the magnetic moment by its mass.

Specific Resistance.—The relative resistance of a substance to the passage of electricity, as referred to some standard substance. The actual resistance of a cube of a substance which is one centimeter on edge, being usually expressed in microhms for metals and ohms for liquids. Specific conduction resistance.

Specific Resistance of Liquids.—The resistance offered by a specific length and area of cross section of a liquid as measured by the resistance of the same length and area of cross section in a standard conductor.

Spectrograph.—A proposed term for radiograph.

Spectrophone.—An instrument used to examine the ultra red portion of the spectrum.

Spectroscope.—An optical instrument for examining spectra, particularly those produced by flames in which different substances are volatilized, so as to determine, from the position of the spectral lines, the composition of the substance.

Spectrum.—The several colored and other rays of which light is composed, separated by the refraction of a prism or other means, and exhibited either as spread out on a screen or by direct vision.

Speed Counter.—An instrument which records the number of revolutions which a shaft makes.

Speed and Direction Indicator.—A telegraph employed on shipboard to indicate the propeller shaft revolution as to speed and its movements as to direction.

Speed Indicator.—A speed counter.

Speed of Rotation.—The number of revolutions made in any length of time. The distance which the circumference of a rotating wheel will pass over in a given time.

Speed Recorder.—An instrument which records instantaneously the speed of a machine.

Speeding of Dynamo.—Modifying the speed of a dynamo in order to get the correct speed required for the operation of an electro-receptive device which has been put into the circuit.

Spelter.—Commercial zinc.

Spent Acid.—Acid which has lost its power of action from long use.

Spent Liquor.—Liquor such as used in an acid or bath which has lost its power of action from long use.

Spherical Aberration.—Incorrect outlines of the images produced in a lens or mirror with special faces, due to a defect in the curvature of one or both of the faces and calling for as a remedy a slight departure from the true spherical form in order to produce a perfect image.

Spherical Armature.—A dynamo armature whose coils are wound on a spherical core.

Spherical Candle-Power.—The average candle-power of a luminous source in every direction. The average of a number of observations taken at different angles, the source being moved about from one position to another.

Spherical Candle-Power Measure.—An instrument which measures, or by means of which is measured, and by a single observation, the average spherical candle power from a source of light.

Spherical Candle-Power Photometer.—A photometer contrived for the measurement of the average spherical candle-power of a lamp or of any luminous source from one observation only.

Spherometer.—An instrument for measuring the curvature of a sphere.

Sphygmograph.—An instrument employed to record the action of the pulse and usually applied to the radial artery at the wrist.

Sphygmophone.—An apparatus embracing a microphone and employed to examine the pulse.

Spider.—A radial bracket serving to support an armature or machine on a revolving shaft.

Spider Arm.—A projection of a spider.

Spiral.—A term used at times, signifying an open conducting coil, as, for instance, the primary or secondary of an induction coil or transformer.

Spiral Loop System of Distribution.—A term used to signify a variety of parallel distribution, employed to obtain a uniform distribution of potential, the parallel conductors being extended in the arcs of spirals throughout the district to be served, from the power station; both spirals reaching from one nearly to the other generator.

Spiral Windings.—Solenoidal winding.

Splice Bar.—A fish plate used in railroad construction for joining the ends of rails.

Splice Box.—A box which contains the splices in electric lines and underground cables, the splicing ordinarily being effected in the boxes.

Splicing.—Uniting the armor or protecting coverings of the two ends of a cable at a joint.

Splicing Ear.—A trolley ear serving to join the ends of trolley wire.

Split Battery.—A battery of a number of voltaic cells, connected in series, with their central portion grounded or connected to the earth.

Split Condenser.—A condenser designed by its arrangement for the convenient inter-connection of its different sections in the same circuit, or for their employment in different circuits as occasion may demand.

Split Current.—A current that is divided. A current taken from the main telegraph wire.

Split Phase.—The difference resulting in the phases of alternating currents produced by the division of a uniphase alternating current.

Split-Phase Motor.—A multiphase motor which by the introduction of a phase-splitting contrivance is operated from a uniphase alternating-current circuit. A multiphase motor wherein from a single-phase circuit the multiphase currents are locally produced.

Split-Secondary of Induction Coil.—A secondary of an induction coil that is divided into two equal parts.

Spluttering of Arc.—A spluttering noise emanating from a voltaic arc while it is forming.

Spot.—A bright spot of light which appears on the scale of the mirror galvanometer.

Spotty Filament.—An incandescent lamp filament which presents points of unequal brilliancy when raised to incandescence by the passage of the current and which is due to local variations of resistance.

Spreading the Magnetic Field.—Deviation of a magnetic field.

Sprengal Mercury Pump.—An air pump, a column of mercury in which acts as a piston, the actuating force being the weight of the column, which is required to exceed thirty inches in height.

Spring Ammeter.—An ammeter in which the part moved by the current is controlled or brought to the zero position by a spring.

Spring Clips of Switch.—Spring clips of a switch which hold the blades when closed.

Spring Contact.—A spring connected to one lead of an electric circuit, arranged to press against another spring or contact point which it opens or closes.

Spring Dynamometer.—A dynamometer which depends for its operation upon the action of a spring.

Spring Jack.—A spring contact having a hole in it provided for the introduction of a plug.

Spring Relay-Contact.—A style of relay contact which is stopped by a spring when the circuit is broken.

Spring Voltmeter.—A voltmeter the potential difference in which is determined by a magnetic needle moving against the pull of a spring.

Spurious Hall Effect.—A spurious electro-motive force caused in an electric conductor, through which a current is flowing, by variations in conductivity of the conductor produced by a magnetic field.

Spurious Resistance.—The counter-electro-motive force operating to prevent a current from being produced to that extent which would be its full strength were the true resistance and actuating electromotive force only involved.

Square Mil.—A unit of area equal to .000001 square inch and used in the measurement of the areas of cross section in wires.

Squirted Filament.—An incandescent lamp filament obtained by forcing with pressure a carbonized carbonaceous composition through a hole of proper shape.

Stable Equilibrium.—That equilibrium of a body resting upon a base, which requires its center of gravity to be raised in order to upset it.

Stage Regulator.—A controller employed in a theater, and located near the stage, by means of which the incandescent lamps can be lighted, extinguished, or their brilliancy varied.

Staggering of Dynamo Brushes.—A term used indicating a certain position of the brushes on a commutator cylinder, one brush being set just forward of the other in order that the formation of the grooves caused by wear may be obviated.

Standard Candle.—A standard of illuminating power, generally understood to be the English standard sperm candle, which when burning at the rate of two grains of sperm wax per minute produces a light of a brightness equal to one candle power.

Standard Compass.—A compass employed on shipboard as a standard with which to compare and check other compasses.

Standard Earth-Quadrant.—A length approximating 10,000 kilometers, one-quarter of the earth's meridian circle, through Paris. A unit of inductance; the henry.

Standard Luminous Intensity.—A unit of luminous intensity taken as a standard.

Standard Megohm.—A resistance which is equal to one million ohms.

Standard Ohm.—A piece of pure copper wire, one circular mil in diameter, and one foot long at a certain temperature.

Standard Resistance.—A known resistance employed to determine unknown resistances by comparison.

Standard Resistance Coil.—A coil having a resistance of a standard ohm or a multiple of a standard ohm.

Standard Voltaic Cell.—A voltaic cell employed as a standard in the measurement of unknown electromotive forces, by reason of its own electromotive force being practically constant.

Standard Wire Gauge.—A wire gauge adopted by the National Electric Light Association and the National Telephone Exchange Association of America; its gauge numbers ranging from 0000—.46 inch diameter to 40—.00314 inch diameter.

Standards.—Supports located on the roofs of buildings and employed to support telephone wires. Any standard, such as a resistance coil or voltaic cell used for making comparisons. The support for the bearings of a dynamo and some other machines.

Standardized Resistance Coil.—A coil whose resistance has been determined by careful comparison with a standard.

Standardizing a Voltaic Cell.—Ascertaining the precise value of a voltaic cell's electromotive force, so that it will serve as a standard of comparison.

Star Current in Polyphase System.—In a polyphase system, the current between any terminal and the neutral point, or the current in any branch of the system.

Star Potential in Polyphase System.—In a polyphase system the difference of voltmeter pressure or of potential between any terminal and the neutral point.

Star Triphase-Winding.—The connecting together of three triphase windings at a common junction, the three free ends being connected to the terminals.

Starting Box.—A starting resistance.

Starting Box for Electric Motor.—A resistance by which an electric motor is started.

Starting Box of Shunt-Wound-Motor.—A box which has a rheostat whose resistance is variable and em-

ployed in connection with the armature circuit of a shunt-wound motor in order to impede the rush of current which attends the connection of the motor with the driving circuit.

Starting Current of Motor.—The current which traverses the coils of a motor when it first starts.

Starting Motor for Synchronous Motor.—A small electric motor serving, at times, to obtain the proper speed for the armature of a synchronous single phase motor before making the connection with the driving-current circuit.

Starting Position of Street-Car Controller.—The position of a controller switch on a street-car at which the current is first taken into the motors at starting.

Starting Rheostat.—Coils of wire mounted and connected so that they can be introduced in the circuit of a motor in succession while it is being started.

Starting Torque of Motor.—The torque necessary to start a motor and that which is developed by the motor when starting.

Static Breeze.—The silent or brush discharge of high tension electricity.

Static Discharge.—Disruptive discharge.

Static Electricity.—Electricity generated by friction.

Static Energy.—That energy which a body possesses when at rest due to advantage of position or other causes, such as the stress of a spring or the foot pounds of a pound weight supported a certain number of feet above a plane.

Static Hysteresis.—A phenomenon of magnetization of iron attributed to molecular friction, by reason of

which considerable energy is expended during every reversal in its magnetization as contradistinguished from viscous hysteresis.

Static Shock.—A term in electro-therapeutics for a method of applying static discharges from small condensers or Leyden jars to a patient who is insulated from the ground with one electrode applied to the conducting surface on which he rests, while the other, spherical electrode, is brought near the body so as to produce a disruptive or spark discharge.

Static System of Induction Telegraphy.—A mode of electric communication without any metallic connection between the stations; but which depends upon static induction between the instruments for sending and receiving. Wireless telegraphy.

Static Transformer.—A term used to distinguish the ordinary transformer from a rotary transformer.

Statics.—That branch of mechanics which treats of the equilibrium of forces, or relates to bodies as held at rest by the forces acting on them; in distinction from dynamics, or the science of forces producing motion.

Static Circuit-Breaker.—A circuit breaker employed in a central station.

Station Load.—The entire load on a central station at any time.

Station Load-Curve.—A curve which represents the station load at any time.

Station Recording-Wattmeter.—A wattmeter adaptable for central stations for the purpose of recording the energy delivered.

Station Transformer.—A transformer used in a central station, or one which supplies a load in a station. A transformer designed to furnish the current for potential indicators and lamps on the station switchboard.

Stationary Transformers.—A term used to signify alternating-current transformers as contradistinguished from rotary transformers.

Stationary Electric Motor.—An electric motor firmly attached to the ground or floor as contradistinguished from one which moves about.

Stationary Tachometer.—A tachometer which indicates the number of revolutions per minute of a shaft in a stationary rotating machine.

Stator.—The stationary portion of a rotary field induction motor in distinction from the portion which rotates.

Stator Armature.—A dynamo or motor armature which remains at rest while the machine is in operation. A part of a machine which is at once its armature and immovable.

Statute Mile.—A British statute mile equal to 5,280 feet.

Steady Current.—A current whose strength is fixed or invariable.

Steam Governor, Electric.—An electric device whose employment in connection with a valve regulates the supply of steam to an engine so that the engine is driven at a speed such as to maintain a constant potential or a constant current.

Steam-Turbine Dynamo.—A dynamo of high speed, a steam turbine being employed to drive the armature.

Steering Compass.—A compass provided on shipboard for steering a ship.

Steering, Electric.—Steering by means of electricity.

Step-Down Converter.—A step-down transformer.

Step-Down Transformer.—A transformer which transforms a small current of great difference of potential into a large current of small difference of potential.

Step-Up Converter.—A step-up transformer.

Step-Up Transformer.—A transformer which transforms a large current of small difference of potential into a small current of great difference of potential.

Stereopticon.—An instrument provided with a lantern and other accessories and used to project the images of objects upon a screen so that they stand out in relief.

Sterilization, Electric.—A mode of sterilizing solutions, which consists in destroying the germs by means of electric currents.

Stethoscope.—An instrument for ascertaining the condition of the heart, lungs, and system of circulation generally by the sound they produce.

Sticking of Magnetic Armature.—The adherence after the current is cut off of the armature to the poles of the magnet.

Stiff Field.—A magnetic field whose density is comparatively great.

Stock Ticker.—An instrument employed in brokers' offices and elsewhere for receiving quotations and other information by means of printing appearing

upon a ribbon of paper which is fed from the instrument.

Stock-Ticker Service.—The service which supplies stock quotations from the stock exchange to subscribers.

Stopper Incandescent Lamp.—An incandescent lamp having the filament mounted in the chamber of a closely fitting stopper instead of by being sealed hermetically in the lamp chamber.

Storage Accumulator.—A storage battery.

Storage Battery.—A group consisting of a number of distinct storage cells so connected together as to form a single electric service.

Storage Battery Car.—A motor propelled car whose motor receives its current from storage batteries. A car used to convey storage batteries.

Storage Battery Meter.—A meter employed in connection with a storage battery and serving to indicate the quantity of electric energy remaining in the battery.

Storage Battery Traction.—Car traction electrically created by means of storage batteries.

Storage Capacity.—A name signifying the ampere hours of electricity which can be obtained from a storage battery in current form.

Storage Cell.—Two plates of metal or compounds of metal whose chemical relations are changed by the passage from one plate to the other of an electric current through an electrolyte into which they have been immersed. A term applied to a jar which contains but one cell.

Storage of Energy.—The transformation from kinetic to potential energy.

- Stranded Conductor.**—A conductor which consists of a number of fine twisted conductors and designed either to obtain greater flexibility or to reduce self-induction or Foucault currents.
- Strap Key.**—A key for which a strap of metal is used in the manufacture.
- Strap Switch.**—A switch for which a strap of metal is used in the manufacture.
- Stratification Tube.**—A tube which, through a high vacuum, shows the stratification of the electric discharge. A Geissler tube.
- Stray Currents.**—Eddy currents. Foucault currents.
- Stray Field.**—In a dynamo or motor the section of the field whose lines of force or magnetic flux leakage are not passed through by the armature windings.
- Stray Flux.**—The flux of a stray field.
- Street Car Controller.**—An electrical device enclosed in a box on the car-platform and serving to regulate the speed of an electric car.
- Street-Car Lamp.**—An incandescent lamp whose filament is anchored and adaptable for use in street cars.
- Street-Car Motor.**—A motor used to propel trolley cars.
- Street-Car Recording Wattmeter.**—A wattmeter designed for recording the supply of energy received by a street-car in a specified length of time.
- Street Load-Diagram.**—A diagram made to show the electric load on the different streets in a district supplied with electricity.
- Street Mains.**—The conductors in a system of electric distribution, which extend through the streets between the different junction boxes and which serve

to distribute the current from the feeders and with which service wires are connected.

Street Railway, Electric.—A street railway which is operated by electricity or power supplied electrically.

Street Service.—That part of a circuit in a system of incandescent lamp distribution which extends from the main to the cut-outs, and which is external to the building or structure supplied.

Strength of Current.—Amperage—Quality of current in a circuit.

Strength of Magnetic Field.—The intensity of a magnetic field at any point determined by the force with which it acts on a unit magnet pole located at that point.

Stress.—Force acting upon a solid body by pull, pressure or in other ways, and which produces distortion or strain.

Stress Flux.—Flux from whose action a stress results.

Striking an Arc.—Moving the carbon electrodes apart in order to form an arc between them.

Striking Bath.—A bath used in silver plating and which contains a larger proportion of free cyanide than of silver, thus obtaining instantly a deposit upon the object to be plated, before it is placed in the regular plating bath.

Striking Distance.—Sparking distance. The distance which a disruptive charge will traverse.

Striking Mechanism of Arc Lamp.—Mechanism which separates the carbons in an arc lamp when the arc is formed.

Strip Fuse.—A safety strip.

Strip Resistance.—A resistance in which strip conductors are employed.

Stripping Liquid.—The liquid in a stripping bath. The liquid used in the process of removing the superficial layer of one metal from the surface of another by electrolysis.

Strong-Current Arrester.—An arrester adaptable for the protection of a line against currents resulting from contact with a trolley circuit or any other circuit of strong current.

Struck.—A term in electro-plating used in relation to metallic surfaces which have been electrolytically covered with a film of silver or nickel by immersion in a bath and exposure for a few seconds to the action of a strong current.

Structural Carbon.—A lamp filament produced by carbonizing any structural material capable of being carbonized, as bamboo for instance.

Structureless Carbons.—Lamp filaments produced by carbonizing structureless materials, as for instance tamine and other materials.

Sub-Aqueous Cable.—A cable used in sub-aqueous work usually in fresh water. Cables used in rivers in distinction from sub-marine or ocean cables.

Sub-Center Transformer.—A transformer located at a sub-center of distribution and which supplies secondary circuits radiating therefrom.

Sub-Divided Conductor.—A multiple-wire, stranded or composite conductor.

Sub-Divided Transformer.—A transformer in whose primary or secondary coils there are subdivisions. A transformer whose magnetic circuit is subdivided.

Sub-Exchange for Telephones.—A subordinate exchange. A local exchange operating under a central exchange.

Sub-Mains.—Branch conductors from mains.

Sub-Marine.—Under the sea.

Sub-Marine Boat, Electric.—A boat so constructed as to be driven and steered under water.

Sub-Marine Cable.—A cable intended for use under the ocean.

Sub-Marine Finder.—A proposed form of induction balance for locating submerged bodies or objects of metal, such as ships, anchors, torpedoes, etc.

Sub-Marine Fuse.—A fuse serving to ignite and explode a sub-marine mine.

Sub-Marine Key.—A key employed in sub-marine telegraphic operations.

Sub-Marine Mine.—A mass of highly explosive material confined in water-tight metallic receptacles and sunk in the water for the purpose of destroying by an explosion the vessel of an enemy which may pass over them.

Sub-Marine Search Light.—An incandescent light serving to explore under water.

Sub-Marine Sentry.—A water kite, situated under a vessel, and employed in sub-marine cable work to indicate very shallow places in the water, by rising to the surface when touching sea-bottom.

Sub-Marine Telegraphy.—Trans-oceanic telegraphy. A system of telegraphy employing a sub-marine cable as a line wire.

Sub-Marine Telephony.—Telephony effected by the use of sub-marine cables.

Sub-Permanent Magnetism.—A term applied to magnetism present in an iron ship and meaning that such magnetism is not as marked as that present in a bar of magnetized steel.

Sub-Station.—An auxiliary station.

Sub-Station Accumulator.—An accumulator used at sub-stations.

Sub-Station Transformer.—A transformer used at sub-stations.

Subway, Electric.—An underground passage way utilized to receive electric-light wires or cables.

Sulphating.—In storage battery cells, the formation of a hard, white basic sulphate due to over-exhaustion of the cells resulting in a loss in the operation of the cells.

Sunflower Commutator.—A commutator whose appearance resembles that of a sunflower. A style of disc commutator.

Sun-Light Color-Values.—Luminous frequencies which give to the light of an artificial source the same effects which sunlight produces.

Sun-Spot Disturbance.—Disturbance due to the presence of spots on the sun.

Sun-Spots.—Dark areas which are observed at times on the sun's surface.

Sun-Stroke, Electric.—Effects due to exposure to the arc light and similar to those produced by sun-stroke.

Sun Telegraph.—The heliograph.

Sunk Winding.—An iron-clad winding. A winding made in slots or grooves and buried below the surface of an armature.

Superposed Magnetism.—A term which characterizes a magnetism impressed on a substance which has already been magnetized.

Super-Saturation.—The condition assumed by a solution which has cooled below its solidifying point while not exposed to air.

Super-Saturation of Solution.—The condition obtained when a warmed saturated solution of salt, contained in a tight vessel, has cooled without exposure to the air, being shaken.

Supplement of Angle.—That which is required to bring the value of an angle to 180 degrees.

Supplementary Dynamo.—A term signifying a booster dynamo.

Supply Meter, Electric.—A meter whose function is to measure the supply of electricity furnished to a machine or a purchaser.

Support Plate of Storage Cell.—A storage cell's grid.

Surface Action.—Action confined to a surface.

Surface Contact of Street-Railway Car.—A contact which is situated on a level with the street surface and designed for use in an electric street railway system in connection with the driving of the cars.

Surface Contact Street Railway System.—A third rail system. An electric street railway system in which surface contacts are used.

Surface Integral of Magnetic Induction.—The entire volume of magnetic flux which passes through a surface.

Surface-Wound Armature.—An armature wound upon its surface, the conductors lying on the surface of

its coil, instead of being wound in grooves like the iron-clad armature.

Surgical Lamp.—A lamp used by surgeons for examining and operating upon the human body.

Surgical Circuit.—A circuit having a surging discharge passing through it.

Surging Discharge.—The disruptive or sudden discharge of such a static condenser as a Leyden jar, or of any other charged conductors; the discharge being oscillatory in character.

Surgings, Electric.—Oscillating vibrations present in a conductor which is rapidly discharging or being charged. Direct or induced electric oscillations.

Susceptance.—A quantity, in an alternating-current circuit conductor, whose square plus the square of conductance equals the square of admittance.

Suspended-Coil Galvanometer.—A galvanometer with a suspended coil by the movements of which a current passing through it is measured.

Suspension.—The mechanism by which anything is suspended. The means by which any apparatus or accessory thereto is suspended, as for instance a car-motor, pendulum, needle, etc.

Suspension for Car-Motor.—The means by which a car-motor is kept in position on the truck of a car.

Swage.—A tool variously shaped or grooved on the end or face and used by workers in metals for shaping their work, whether in sheet metal or forging, by holding the tool upon the work or the work upon the tool and striking with a sledge.

Swage.—To shape heated metals by means of a swage; to fashion, as a piece of iron, by drawing or ham-

mering it into a groove or mould having the required shape.

Swaging.—The shaping of heated metals by drawing or hammering them into a tool having the required shape.

Swaging, Electric.—Swaging metals while softened by electric heat (see swaging).

Sweating.—A process by which the ends of electric-light cables are soldered together.

Swinging Cross.—A term applied to an intermittent cross.

Swinging Earth.—A term applied to an intermittent earth.

Swinging Voltmeter.—A voltmeter which can be read from any direction, being supported on a swinging bracket attached to a switchboard.

Switch.—A device for opening and closing an electric circuit.

Switch-Bell.—A switch and bell combined.

Switch Blade.—The blade of a switch. A conducting strip.

Switch-Board.—A board or tablet to which wires are led connecting with cross bars or other switching devices, so as to allow connections to be made with other circuits or between themselves. A board equipped with switches and instruments which serve to control a distribution system and the generators employed in it. A board equipped with switches for opening or closing or interchanging electric circuits connected with it.

Switch-Board Fittings.—A general term applied to the divers fittings or accessory devices of a switch-

board, such as connectors, set-screws, wire-holders or bus-bar connections, by means of which the different apparatuses are placed upon the board.

Switch-Board Transformers.—Transformers serving on an alternating-current switch board to furnish locally alternating currents of reduced pressure.

Switch-Board Wattmeter.—A wattmeter mounted on a switch board and whose functions is to indicate the quantity of energy which some circuit connected therewith puts out or takes in.

Switched-In.—Placed in a circuit by the manipulation of a switch.

Switched-Out.—Removal from a circuit by the manipulation of a switch.

Swivel Clevis.—A nut and bolt contrivance used to take up slack in guy-rods.

Symmetrical Alternating Current.—An alternating current, the suggestive alternations of which have opposite values but equal to each other, differing only with respect to direction.

Symmetrical Magnetic Field.—A field of symmetrically distributed magnetic flux.

Symmetrical Polyphase System.—A polyphase system which with respect to pressures, conductors, currents and loads is symmetrically arranged.

Sympathetic Electric Vibrations.—Electric vibrations which the electro-magnetic waves sent out by one circuit produces in another. Electric vibrations due to resonance.

Synchronism.—Occurrence of two or more events simultaneously. Unison of recurrence in apparatus of

alternating-current systems occurring at the same time.

Synchronize.—To agree in time; to be simultaneous. To effect concurrence or unison and coincidence of phase in two alternating-current machines in order to connect them together electrically.

Synchronizer.—That which causes synchronism. A contrivance which indicates when synchronism has been reached in alternators to be connected in parallel.

Synchronizing Dynamo-Electric Machine.—The act of adjusting the recurrences and phases of two alternating-current dynamos in order that they may be connected in parallel.

Synchronizing Torque.—The torque which tends to bring into synchronism its own alternating-current generator armature with some other armature operating with it.

Synchronous.—Simultaneously occurring, usually understood as co-periodic and co-phasal in distinction from periodic agreement only.

Synchronous Generator.—An alternating-current generator capable of synchronous operation with another generator.

Synchronous Motor.—An alternating-current motor which will operate properly only after being brought into step with the driving current.

Synchronous Multiplex Telegraphy.—A system of telegraphy in which a number of messages are transmitted simultaneously over a single wire, all in one direction, or some in one direction and some in the opposite.

Synchronous Vibrations.—Vibrations excited by several distinct systems which are in exact unison both in recurrence and phase.

Synthesis.—The uniting of elements to form a compound. The opposite of analysis.

T.

T-Connector.—A connector similar in shape to the letter T and serving to connect a wire with two branch wires.

Table Push.—A push button connected with a call-bell and located on a table for convenience in ringing.

Tablet Board.—A panel switchboard or one divided into tablets.

Tachograph.—An instrument which records the number of revolutions made in a machine or shaft per minute.

Tachometer.—An instrument for measuring the velocity and variations of velocity of machines and shafts and indicating on a dial the number of these revolutions per minute.

Tail of Mercury.—A trail left behind a drop of impure mercury when drawn over a surface, indicating the presence of oxides.

Tailings.—In a telegraph line, the prolongation of a current at the remote receiving station due to self-induction and the discharge of the line. The interference with the definiteness of signal marks due to retardation in high speed transmission of telegraph signals by the automatic system. Residual dis-

charges through the receiving instrument from the line producing wrong marks.

Talking Circuit.—A circuit in a telephone system which a subscriber uses during conversation in distinction from a circuit used for calling.

Tamadine.—A form of cellulose, used for making the filaments of an incandescent lamp by cutting the material into proper shapes and then carbonizing them.

Tangent.—A right line touching an arc at one extremity and terminated by a secant passing through the other extremity.

Tangent and Sine Galvanometer.—A galvanometer provided with two magnetic needles differing in length, the shorter serving to measure tangents and the longer being used for sine measurements of current strength.

Tangent Scale.—An arc of a circle wherein the number of graduations in any arc commencing at zero are proportional to the tangent of the angle which such arc subtends; thus, the scale, instead of being divided into degrees, is divided into arcs of varying lengths, which obviates the necessity of consulting tables to find tangents corresponding to the degrees.

Tanning, Electric.—The tanning of leather by means of electric currents.

Tap.—A conductor connected to a larger conductor as a shunt. A derived circuit serving to carry off a portion of a main current.

Tap Wires.—The conductors serving in trolley systems to take the current from the mains at a pole to an adjacent point on the trolley wire.

Taped Wire.—A wire insulated with a material similar in form to tape, or insulated with a suitable material and then wound with tape.

Taping.—Wrapping insulated tape around a wire or joint.

Taps.—Branches which connect with mains and are taken from them into the different apartments and to the fixtures in a building supplied by a system of incandescent lamp distribution.

Target, Electric.—A target which registers automatically by means of electricity the points struck by a ball.

Teaser, Electric.—A fine wire coil wound on the field magnets of a dynamo in shunt with the regular magnet.

Teaser Winding.—An extra coil with which the armature of a monocyclic generator is wound and consisting of less turns and smaller cross-section than the main winding, one end of it being connected to a collecting ring, while the other is connected with the center of the main winding.

Teeth of Armature.—Ridges projecting from the surface of an armature core in which the armature conductors rest.

Tel-Autograph.—A system of telegraphy by means of which the reproduction of writing in fac-simile is effected at a distance.

Tele-Barograph.—An instrument which records the indications of a barometer at a distance.

Tele-Barometer, Electric.—A barometer which records by means of electricity the indications of barometric pressure at a distance.

Telegraph.—An instrument or apparatus, or a process for communicating intelligence rapidly between distant points by employing signs representing words or ideas and transmitted by means of electricity over conductors.

Telegrapher's Cramp.—A disease of the hand sometimes contracted by telegraph operators and caused by the too excessive use of the muscles of the hand in telegraphing.

Telegraphic Box-Sounder.—A sounder having its receiving magnets confined in a resonant box in order that the intensity of the sound may be increased.

Telegraphic Interrupter.—A defect in a line which interferes with the transmission of telegraphic communications.

Telegraphic Key.—A key or switch used by an operator, by means of which he makes-and-breaks the circuit in a manner to correspond to the dots and dashes of the Morse alphabet.

Telegraphic Repeater.—An extension of the relay system adopted for long lines. An instrument which causes the telegraphic apparatus in a station to repeat the message into another circuit.

Telegraphic Stock-Printer.—An instrument which prints on ribbons of paper the quotations of stock transmitted from the stock exchange.

Telegraphic Time-Service.—Time distribution by telegraph. Time sent out to subscribers from a standard clock by means of electricity.

Tele-Hydro-Barometer.—An instrument employed to record and indicate at a distance the height of liquids in a vessel or receptacle.

Tele-Hydro-Barometer, Electric.—An instrument employing electricity to effect the record and registration of the height of liquids in a vessel or receiver at distant stations.

Telephone.—An instrument which transmits articulate speech by means of electricity.

Telephone Battery.—Any style of open-circuit battery which can be adapted to use in telephone service.

Telephone Cable.—A cable either overhead or under ground which is adaptable for the transmission of telephonic messages.

Telephone Call-Bell.—A bell serving to call the person with whom the subscriber desires to speak.

Telephone Call-Wire.—A wire used in some systems by means of which a subscriber is enabled to call up the central office. A special wire for calling.

Telephone Cords.—Flexible cords used for the convenient moving about of telephone receivers and for other purposes.

Telephone Cross-Talk.—An interference in a circuit resulting from induction or leakage from an adjacent circuit.

Telephone Drop.—A contrivance corresponding to an annunciator drop and employed on a switchboard.

Telephone Exchange.—A central station fully equipped with circuits, switches and all the other accessories of a complete apparatus, which are employed to place subscribers in communication with each other, or with another exchange.

Telephone-Exchange Switchboard.—A central station switchboard by means of which subscribers are readily placed in connection with each other.

Telephone Galvanometer.—A galvanometer of high resistance, comprising an electro-magnet with a thin plate or disc of iron carefully adjusted between its poles and bridged permanently across the circuit of a telephone in order that visual call-signals may be given.

Telephone Head-Gear.—An appliance for the head enabling a telephone receiver to be attached conveniently to the ear of the operator.

Telephone Repeating-Coil.—A style of induction coil serving to repeat telephonic messages. An induction coil provided with an insulated winding in each of the two circuits to be connected.

Telephone Set.—A term in its usual application signifying the apparatus which a telephone subscriber uses at his business place or home.

Telephone Tinnitus.—A nervous disorder of the auditory sense caused by continual use of the telephone.

Telephone Transformer.—An instrument which serves to repeat a telephonic message from one circuit into another.

Telephonic Receiver.—That part of a telephone apparatus which is used to receive the message by placing it in contact with the ear.

Telescope.—An optical instrument employed in viewing distant objects and which enlarges the visual angle under which they are seen, thus increasing their apparent dimensions.

Temper.—To render metals hard and elastic by suddenly cooling them while heated.

Temperature.—Condition with respect to heat or cold as indicated by the sensations produced or by the thermometer or pyrometer. Degree of heat or cold.

Temperature Alarm, Electric.—An electric device designed to give an alarm and which is automatically operated by a change of temperature.

Temperature Elevation.—The temperature of a body in excess of its surroundings. The temperature of a conductor which, due to the passage of a current through it, is greater than that of the surrounding atmosphere.

Temperature Gradient.—A line which indicates the rate-of-change in an object or mass through which heat is passing.

Tempering.—Rendering metals hard and elastic to different degrees required by heating them to various temperatures and then cooling them suddenly.

Temporary.—Lasting for a time only.

Temporary Currents.—Currents which continue for a short time only.

Temporary Intensity of Magnetization.—The intensity of magnetization induced for a short while in soft iron in distinction from that permanently induced in steel.

Temporary Magnetization.—A term applied to the magnetization induced in a body of soft iron when subjected to the influence of a magnetic field.

Tenacity.—That quality of bodies which keeps them from parting without considerable force.

Tension.—The degree of stretching to which a wire, cord and the like is strained by drawing it in the direction of its length. Strain. The force with which particles of gas tend to recede from each other and occupy a larger space.

Tension, Electric.—A term not properly used, signify-

ing electromotive intensity, electromotive force, dielectric stress or difference of potential, all of which should be designated by their proper terms.

Terminal Pressure.—The pressure indicated at electric terminals.

Terminal Voltage.—Terminal electromotive force.

Terminals.—The poles or electrodes of a voltaic battery.

Tesla Coil.—An induction coil insulated by means of oil.

Tesla Discharge.—A disruptive discharge of exceedingly high frequency.

Tesla Frequencies.—Frequencies higher than those usually employed.

Tesla Transformer.—An oil insulated transformer which raises the potential and decreases the current in the secondary and used by Tesla to obtain high frequencies.

Test Board.—A board which is equipped with spring jacks or switches connected with separate lines to facilitate the ready connection of testing instruments with any particular lines and employed principally in telephone and telegraph central offices.

Test Ring.—A call from central station made to the subscribers in order to learn whether or not the line is in good working condition.

Test Thimble.—A thimble provided with a contact and serving in telephone exchanges to make a busy test at a multiple switchboard.

Test Wire for Multiple Switchboard.—A wire making a connection with the jacks of the same number of the different sections on a multiple switchboard at

a central station, and which enables the operator to ascertain whether a subscriber called is busy or not.

Testing.—Making a trial to determine electric ability. Determining the factors of electric capacity generally in a circuit.

Testing Bank.—A bank employed in testing circuits, consisting of lamps or other resistances and having no induction.

Testing Car for Railway Circuits.—A trolley car serving to make electric test while in motion.

Testing, Magneto.—A magneto-electric machine which produces the high electromotive force necessary to test circuits of high resistance.

Testing of Joints.—Ascertaining in any circuit the usual insulation or conductor resistance of a joint.

Testing Room.—A room equipped with all the necessary apparatus for electric testing. A room on ships used for cable laying, which is equipped with necessary apparatus for signaling and making tests.

Testing Transformer.—A transformer employed in testing to discover the efficiency or otherwise of all those factors which enter into the operation of an electric distribution system.

Tetanus.—Persistent spasm of the voluntary muscles. Lockjaw.

Tetrad Atom.—An atom whose atomicity is four.

Tetrivalent.—Having an atomicity of four.

Thaumatrope.—An optical toy for showing the persistence of an impression upon the eye after the luminous object is withdrawn, and consists of a card having on its opposite faces figures of two differ-

ent objects, as a bird and a cage, and the card on being rapidly whirled around a diameter by the strings that hold it, the appearance presented to the eye is that of a single picture, as the bird in the cage.

Theater Dimmer.—A contrivance serving in theaters to vary the intensity of the light. A choking coil.

Theater Dimming Rheostat.—A rheostat used together with a dimmer in a theater.

Theodolite.—An instrument variously constructed, used in trigonometrical surveying, for the accurate measurement of horizontal and vertical angles.

Theoretical Magnet.—An imaginary magnet, assumed to possess uniform magnetization, infinite length and thinness. A hypothesis for the purpose of mathematical discussion.

Therm.—A unit of heat required to raise the temperature of one gramme of water one degree, centigrade, starting at the temperature of its maximum density.

Thermal.—Pertaining to heat.

Thermal Absorption.—The absorption of heat while it is passing through a body.

Thermal Activity.—The activity which a body possesses by reason of its heat energy. The rate at which heat is generated. The rate at which thermal work is done.

Thermal Circuit Closer.—A circuit closer whose operation is effected by changes of temperature.

Thermal Current.—A current resulting from the flow of heat through a conductor.

Thermal Current-Strength.—The quantity of heat which is transmitted per second across a conductor's area of normal cross-section.

Thermal Equivalent of Work.—The equivalent of a specified quantity of mechanical work in heat units.

Thermal Resistance.—The resistance which a body offers to the passage of heat through it.

Thermo-Barometer.—An instrument by means of which an altitude is determined by its reading of the boiling temperature of water at such altitude. A hysometer.

Thermo-Chemistry.—The branch of the science of chemistry which relates to the measurement, in thermal units, of chemical energy.

Thermo-Electric Call.—An instrument which sounds an alarm by means of electricity when the temperature goes above or below a certain point.

Thermo-Electricity.—Electromotive forces produced from heat energy by direct conversion or by differences of temperature at the junction of unlike metals.

Thermo-Magnetic Generator.—An instrument by means of which electricity is produced under the influence of heat and magnetism. A pyro-magnetic generator.

Thermometer, Electric.—A thermometer whose indications result from the variation of resistance in conductors with variation of temperature. An instrument employed to ascertain the effects of an electrical discharge, and which are determined by the movements of a liquid column, resulting from the

expansion of a confined body of air which the discharge passes through.

Thermometric Conductivity.—The ratio of heat conductivity as determined by measurement to the specific heat of unit volume.

Thermometry.—The science which treats of the measurement of temperature.

Thermophone.—An instrument which produces sound by means of electricity. An instrument which by absorbing radiant energy produces sounds.

Thermostat.—An apparatus which automatically closes an electric circuit when heated, thereby maintaining a specific temperature.

Thermostatic Regulation.—The regulation of temperature obtained through the action of a thermostat.

Third-Rail Electric Railway.—An electric street-car railway which employs a third rail which is insulated from the track and answers for one side of the circuit, while the outside rails, in connection with return feeders, answer for the other side of the circuit.

Three-Coil Armature Winding of Alternator.—An armature winding which provides for each and every pole in the field frame, three coils in a ring armature, or three slots in a drum armature.

Three-Coil Armature Winding of Multiphase Alternator.—An armature winding which provides for each and every pole in the field frame, three coils in a ring armature, or three slots in a drum armature, per phase.

Three-Part Commutator.—A commutator consisting of three insulated segments.

Three-Phase Armature.—An armature which has a three-phase winding.

Three-Phase Armature Winding.—An armature winding by which it is enabled to produce three-phase currents.

Three-Phase Bar-Winding for Armature.—A bar winding for an armature by means of which it is capable of producing three-phase currents.

Three-Phase Circuit.—A circuit permitting the transmission of three-phase currents.

Three-Phase Continuous-Current Commutating Machine.—A machine serving to transform three-phase alternating currents to continuous currents, using a revolving armature which has a commutator.

Three-Phase Generator.—A generator possessing the ability to produce three-phase currents.

Three-Phase Motor.—A motor which can be operated by three-phase currents.

Three-Phase Rotating Magnetic Field.—A rotating field which a three-phase current produces.

Three-Phase Transformer.—Three distinct transformers by the employment of which three-phase currents are transformed.

Three-Point Switch.—A switch which completes a circuit through three distinct contact points.

Three-Voltmeter Method of Measurement.—A method for the measurement of activity in alternating current circuits and which provides for the employment of three voltmeters at the same time.

Three-Wire Circuit.—A circuit used in a three-wire system. A three-wire diphasic or triphasic system.

Three-Wire Diphase.—A diphase circuit employing three wires, one of which has a greater area of cross section than the others and serves, therefore, as the common return.

Three-Wire Meter.—A meter employed to record the power delivered on both sides of a three-wire system.

Three-Wire Moulding.—Moulding used in a three-wire system of distribution.

Three-Wire Switchboard.—A switchboard adaptable for use in a three-wire system of distribution.

Three-Wire System.—In multiple arc or constant potential service, a system of distribution of electric current consisting of three main wires which start at the generating source and ramify with corresponding diminution in size everywhere through the lighted district; the dynamos being set in groups of two with one lateral lead leaving the negative binding post of one dynamo, while the positive terminal of that dynamo connects to the negative of the other, and the neutral lead is connected between the two dynamos; the other lateral lead leaving at the positive binding post of the second dynamo.

Three-Wire Transmission.—Transmission effected by the three-wire system.

Three-Wire Telephone Switchboard.—A branch terminal switchboard used in telephone operations.

Throttling.—Cutting off partly or entirely.

Throttling of Lines of Magnetic Force.—Any diminution in magnetic flux density resulting from a magnetic joint, or to diminution in magnetic permeability at any section of a circuit.

Throw.—The deflection of a needle. Elongation.

Throw of Needle.—The angular deflection of the needle when it makes its first move.

Throw-Over Reversing Switch.—A reversing switch thrown from side to side in operating it.

Throw-Over Switch.—A switch serving to quickly change a circuit from one source or system to another source or system. A switch fashioned to move about on an axis, and which can be thrown over from one set of contacts to another.

Thunder.—The sound which follows a flash of lightning. The report of a discharge of atmospheric electricity.

Ticker.—An instrument for receiving stock quotations and other information delivered from the instrument in printing upon a paper ribbon.

Tie Wire.—A wire used to bind an insulator.

Time-Ball, Electric.—A ball which by means of electricity is made to fall from an elevator position upon a high pole; the fall occurring exactly at noon or at any preconcerted hour, and intended as a visual signal by which the correct time may be made known.

Time-Detector, Electric.—A watchman's clock actuated by electricity and which serves to register the time at which the watchman visits the stations on his beat.

Time-Lag of Magnetization.—A condition suggesting lag between the moment when the magnetizing force begins to act and the time of the indicated presence of magnetism.

Time of Vibration.—The time necessary for a back and

forth motion of particles in an elastic medium to be completed.

Time-Switch.—A switch contrived so that it will open or close a circuit at or after the expiration of a certain time. An automatic switch so contrived that a resistance cannot be inserted into it, nor can it be removed from a circuit before the expiration of a certain predetermined time.

Tinned Wire.—Wire covered with tin by the electroplating process.

Tinning Metal.—A solder used to join electrotpe shells or for obtaining the proper condition on their backs preparatory to applying the backing metal.

Toll System.—A system employed in telephone service which provides for a charge for each call made instead of a specified rate of rental per annum.

Tone.—Sound, or the character of sound, or a sound considered as of this or that character. A sound considered as to pitch.

Toothed-Core Armature.—An armature having a laminated core, the toothed disk of which has longitudinal grooves on its surface, and into which the armature coils are placed.

Toothed-Drum Armature.—A toothed-core armature resembling a drum in shape.

Toroid.—A solid whose surface boundary is produced by the revolution of any closed plane about an axis in its plane, and by which it is not cut.

Toroidal Coil.—A coil wound in the shape of a toroid.

Torque.—A force which tends to produce torsion around an axis, as in the pulling or turning moment of an electric motor's armature upon its shaft. The mo-

ment of force which causes the rotation of a dynamo or other machine when applied to it. The mechanical, turning or rotary force whose action produces the rotation of the armature of a dynamo electric machine or motor. The ratio, at belt or pulley, of a motor's mechanical activity to the angular velocity.

Torque Efficiency.—The relation of the torque which a motor exerts at a specific terminal activity, to that which would be exerted were there no loss of energy.

Torreicellian Vacuum.—The vacuum which exists above the mercury column in the tube of a barometer; the principle of this vacuum being applied in the Geissler and other air pumps.

Torsion.—The twisting or wrenching of a body by the exertion of a lateral force.

Total Candle-Power.—The total light given out by any luminous source.

Total Resistance.—The total of a circuit's resistance.

Tower-System of Electric Lighting.—The employment of high towers for lighting large areas; the lights being placed at the top of the towers.

Tower Wagon.—A wagon equipped with a skeleton tower and tools and employed in repair work on trolley lines; the wires being easily reached by means of the tower.

Track Bond.—Rail bond.

Traction, Electric.—The driving of a car on any conveyance by means of an electric motor.

Train Describer.—An electrical instrument which indicates automatically from a distance the location

and character of railroad trains when out on the line.

Train Wire.—A wire connected with the chief train dispatcher's office and used in the block system of railroading for transmitting train orders only.

Trajectory.—The curve described by a body thrown upward obliquely in the air. A curve, which pursuant to a given law, cuts a system of curves produced by varying a parameter.

Trans-Continental Telephony.—Communication across the continent by telephone.

Transfer Bus-Bar.—A bus-bar whose employment serves to obviate a sudden variation of potential by gradually transferring a feeder from one bus-bar to another instead of throwing it over directly.

Transform.—To convert. To change. To change a primary current with high initial electromotive force into a secondary current with low initial electromotive force. To change an alternating current into a continuous current.

Transformation of Electromotive Force or Current.—The conversion of electric energy into another form of energy.

Transformation of Heat.—The conversion of heat energy into another form of energy.

Transformer.—An induction coil by which a primary current of high initial electromotive force is made to produce a secondary current of low initial electromotive force.

Transformer Fuse.—A fuse used in either a transformer's primary or secondary circuit.

Transformer Fuse-Block.—A fuse-block inside of or contiguous to a transformer case.

Transformer Guard.—A lightning guard used in connection with a transformer. A contrivance serving to ground the secondary of a transformer in the event of its making accidental contact with the primary.

Transformer Lightning-Arrester.—A style of lightning arrester serving to protect transformers.

Transformer Motor.—An induction motor.

Transformer Stampings.—Stampings made from sheet steel and used to build the laminated cores of transformers.

Transformer Sub-Station.—A sub-station serving as a sub-center of distribution and containing transformers in groups.

Transforming.—Converting high initial electromotive force into low initial electromotive force. Converting electric energy from lower pressure and stronger current to higher pressure and weaker current.

Transforming Currents.—Effecting a change in the value of a circuit's current strength with a corresponding opposite change of pressure.

Transforming Down.—Reducing the pressure in a circuit of distribution by the use of a step-down transformer.

Transforming Station.—Sub-station containing a number of transformers which serve to supply a collection of buildings in that location.

Transforming Up.—Increasing the pressure in a circuit of distribution by the use of a step-up transformer.

Translucence.—Partial transparency. Transmitting

light, but not permitting objects to be distinctly seen.

Translucent-Disc Photometer.—A photometer in which the two lights to be compared are at or opposite to the ends of a bar scale, with a partly translucent and partly opaque disc between them; the intensity of the light is then determined by the distance of the lights from the disc when both of its surfaces show an equal illumination.

Transmission Dynamometer.—A dynamometer which measures and transmits the power to some machine in distinction from one which absorbs the energy it measures.

Transmission, Electric.—The transmission of energy by electric currents from one point to another.

Transmission of Energy.—The transmission of energy from one point to another.

Transmission of Electric Energy.—The transmission of electric energy from one point to another.

Transmitted Power.—Power transmitted from one point to another.

Transmitter, Electric.—A term embracing in its significance the entire apparatus employed in telegraph or telephone systems for the transmission of electric impulses over a line wire or conductor.

Transposing.—A method for laying metallic circuits, serving in a telephone system to obviate the deleterious effects of mutual induction, and effected by crossing equal lengths of consecutive sections of the line alternately.

Transverse Vibration.—A vibration in which the motion of the successive particles in an elastic medium is

at right angles to the progressive movement of the wave through the medium.

Travelling Derrick.—A derrick erected on a platform and arranged to move on guide rails, thus enabling it to shift and move heavy bodies through short distances.

Travelling Motor.—A motor mounted on a movable car in distinction from a stationary motor.

Travelling of Arc.—The inconstancy of brilliancy in a carbon arc resulting from a shifting of the position of the arc between the electrodes.

Traversing Motor, Electric.—A motor operating with a regular to-and-fro movement through a circumscribed distance. The motor which operates the traverse in a crane worked by electricity.

Treated Coke Filament.—A coke filament for incandescent lamps which has been treated by the flashing process.

Tree-System of Parallel Distribution.—A system of incandescent lamp parallel distribution which may be described by comparing the main conductors to the trunk of a tree, and the auxiliary leads, which run in various directions, to the branches; the lamps occupying the position of the leaves and twigs.

Trega.—A prefix meaning a trillion.

Tregohm.—One trillion ohms.

Trevelyan Effect.—A musical sound which under certain conditions is emitted when a body of heated copper is placed on thin edges supported on a block of cold lead.

Triangular Triphase Winding.—Three-wire triphase or interlinking.

Tricro.—A prefix meaning one trillionth part.

Tricro-Ampere.—The one trillionth of an ampere.

Tricrohm.—The one trillionth of an ohm.

Trigonometrical.—Pertaining to trigonometry. Pertaining to the science of angles.

Trigonometrical Functions.—Quantities definitely related to angles taken as independent variables.

Triphase.—Three-phase.

Triphase Alternating Currents.—Three monophase alternating currents, the phases of which are displaced, with respect to one another, by one-third of a cycle.

Triple-Pole Single-Throw Switch.—A single-throw switch provided with three blades and designed to close three circuits at one and the same time.

Triply Re-Entrant Armature Winding.—An armature winding having three distinct windings, each one being separately re-entrant.

Trolley.—A contact-wheel which rolls over the supply wire in a trolley line and takes off the current required to operate the motor cars.

Trolley Base.—A base serving to support a trolley pole and which is equipped with springs in order to maintain a steady contact between the trolley and the trolley wire; a swivel joint being, in addition provided for reversing the direction of the trolley pole.

Trolley Bus-Bar.—A bus-bar in a railway power station which is connected with the trolley system in distinction to one which is connected with the ground.

Trolley Car.—A motor car in an electric railroad trolley system.

Trolley Car-Controller.—A series-parallel car-controller.

Trolley-Crossing.—An insulating contrivance, serving at the crossing of two trolley wires, to enable a trolley wheel running on one line, to cross the other without making electrical contact. A plate with guides, provided at the crossing of two trolley wires, to aid the trolley wheel in crossing.

Trolley Wheel.—A metallic wheel fixed to the upper end of the trolley pole, and which rolls over the trolley wire, taking therefrom the current required to operate the motor.

Trolley Wire.—The overhead supply wire in a trolley system from which the current required to operate the motor is taken by the trolley wheel.

Trolley Wire Splice.—A splice used in joining the ends of trolley wires and effected by inserting the ends of the two wires into a tubular conductor and then brazing them.

True Resistance.—The true resistance measured in ohms in distinction from counter electro-motive force. The resistance offered by a conductor to the passage of a current by reason of the area of cross section and resistivity.

Trumpet, Electric.—An instrument which has a vibrating tongue and which is actuated by electricity, as the buzzer, and adjusted in the small end of a tube of trumpet shape.

Trunnion Screws.—A pair of screws the opposite points of which constitute the pivots of a movable shutter, armature or other revolving device.

Trunk Call.—A telephone call made through a trunk line.

Trunk Connection.—A connection set up through a telephone trunk wire.

Trunk-Line Wire.—Wires running through between stations remote from each other, their ends only being provided with transmitting and receiving instruments. Main line telephone wires which serve to connect two terminal offices for connection to sub-offices or subscribers. A main line telephone wire serving to connect two important terminals.

Trunk Wire.—A trunk line or main telephone wire. A connecting wire extending from place to place, or exchange to exchange, in distinction from a permanently connected subscriber's wire.

Tubular Electro-Magnet.—An electro-magnet resembling a tube in shape.

Tubular Magnet.—A magnet with a cylindrical casing of iron connected at one end to the core. An iron-clad magnet.

Tumbling Box.—A box devised to rotate and employed to polish metallic articles preparatory to electroplating, and which is effected by the attrition of the objects against one another, in the box, while the same is rotating.

Tuning of Electric Circuit.—Changing a circuit's period or varying either the self-induction or capacity of it in order that it may be brought into resonance with another circuit.

Tunnel Armature.—An armature of a dynamo-electric

machine, with holes beneath the outer surface of the core, into which the conductors are placed.

Turnbuckle.—A device employed to strain span wires. A rod, guy, or line screw tightener.

Twist System.—A method of twisting overhead wires into a form of helical twist, as they are being run, in order to destroy mutual inductive disturbances.

Twist in Armature Leads.—A displacement made of the terminals of the armature leading wires, which are connected with the segments of the commutator, as referred to the position of the armature coils, in order that a better position for the diameter of commutation may be obtained, and accordingly for the points of contact of the commutator's collecting brushes.

Twisted Strip-Voltmeter.—A voltmeter which consists of a strip of platinum-silver, twisted, and whose operation is effected by the coiling and uncoiling of the strip, due to variations in its temperature, produced by the passage through it of the current to be measured.

Twisting Force.—Torque.

Two-Circuit Armature-Winding.—An armature winding which, notwithstanding how great may be the number of poles, provides only two circuits through an armature between the commutator brushes.

Two-Circuit Single-Wound Armature.—An armature whose pitch is always forward, and which possesses two circuits regardless of the number of poles.

Two-Layer Armature-Winding.—An armature winding applied in two layers. A winding possessing more

than two layers, but which would admit of application in two layers only.

Two-Phase Circuit.—A diphasé circuit.

Two-Phase Dynamo or Generator.—A diphasé generator.

Two-Phase Motor.—A diphasé motor.

Two-Phase Rotary-Transformer.—A diphasé rotary transformer.

Two-Wire Incandescent Lighting.—In a system of incandescent lighting, the employment of a single pair of mains, in distinction from three-wire incandescent lighting.

Two-Wire Moulding.—A moulding having two channels or grooves and serving to receive two-wire mains or branches.

Two-Wire Multiple-Switchboard.—A multiple telephone switchboard which has the jacks of a subscriber's circuit connected by two wires.

U.

Ultra-Gaseous Matter.—Gas rarefied to such a high degree that its molecules do not collide. Radiant matter.

Ultra-Incandescent Lamp.—An incandescent lamp whose light is increased in intensity by the radiative powers of oxides of thorium, etc., with which the filament is covered.

Ultra-Ultra-Violet.—A term for luminous frequencies greatly beyond the violet in the spectrum.

Ultra-Violet Rays.—A term for rays the frequencies of which exceed those of violet light.

Ultra-Violet Spectrum.—That part of the spectrum lying beyond the violet, or that part, the frequencies of which exceed those of the violet.

Unbalanced Load.—A load whose distribution is not symmetrical.

Unbalanced Polyphase System.—A multiphase system wherein the distribution of the load and, consequently, the pressures and currents are unsymmetrically distributed.

Unbuilding of Dynamo.—The loss of its charge or excitation by a self-exciting dynamo.

Underground-Cable Terminal.—The point at which an underground cable comes out of the ground. A distributing board located at the point where an underground cable goes into or emerges from the ground, for the purpose of conveniently making and changing the connections.

Underground Conductor.—An electric conductor insulated and placed under the surface of the earth and passing through the ground proper or through conduits.

Underground Electric Conduit.—A subway for the reception of electric telegraph and other conductors under the surface, usually in the line of streets, to dispense with telegraph poles and aerial wiring.

Underground Trolley System.—An electric trolley system in which a plow or sled is substituted for the trolley wheel and is drawn after or pushed ahead of the car, thus making a contact with a wire running inside of a slotted underground conduit.

Undulating Current.—An undulatory current. A cur-

rent whose direction is constant, but whose strength is continuously varying.

Undulator.—A type of rotating commutator employed on continuous-current circuits for the use of transformers. A commutating device which, from a continuous-current circuit, operates an alternating-current apparatus.

Undulatory Currents.—Currents which change in strength without any sudden transition from action to inaction, as in the make and break current.

Undulatory Discharge.—A discharge the strength of which changes gradually without any change of direction.

Undulatory Winding.—A wave winding.

Uni-Directed Currents.—Currents which, by means of a commutator, have been made to take the same direction.

Uni-Directional.—Having the same direction.

Uni-Directional Discharge.—An electric discharge which follows the same direction from first to last.

Uniform Density of Field.—A field in which all equal areas of similar cross section have the same density.

Uniform Flux.—Uniform magnetic flux.

Uniform Magnetic Field.—A field of uniform strength in all portions—as instance the magnetic field of the earth—and when artificially obtained, which cannot be definitely done, it implies great cross section of magnet pole in proportion to the length of the

magnetic needle which it affects and which serves to ascertain its uniformity.

Uniform Magnetic Flux.—A magnetic flux the density of which is uniform.

Uniform Magnetization.—Such character of magnetization of a bar of iron that the same quantity of magnetic flux will traverse equal areas of normal cross-section.

Uniform Potential.—A potential whose value is invariable.

Uniformly Distributed Current.—A steady current. A current whose density in a cross-section of a conductor is the same at all points.

Uniphase.—A single phase. Monophase.

Uniphase Alternator.—An alternator which produces single-phase currents.

Unipolar.—Having one pole only.

Unipolar Armature.—An armature whose windings continuously cut the lines of force about the one pole, its polarity, in consequence, being unchanged in its rotation.

Unipolar Dynamo.—A dynamo equipped with a unipolar armature. A dynamo so constructed that one portion of the conductor slides on or around the magnet in consequence of which it cuts lines of force always near the same pole of the magnet. A dynamo with one field magnet.

Unipolar Magnet.—A proposed term for a poised or suspended magnet one of whose poles lies in the axis of suspension.

Unit of Acceleration.—An acceleration which imparts

unit velocity in unit time to a body; for instance: the centimetre-second.

Unit of Activity.—A rate-of-doing work equal to one unit of work in each second. An activity of one erg per second in the C. G. S. system and the Watt in the practical system.

Unit of Electric Quantity.—The coulomb in the unit practical system. A quantity of electricity transmitted by a unit of current per second.

Unit of Electric Supply.—A unit whose value would be represented by the flowing for one hour of one thousand amperes under an electro-motive force of one volt and which was adopted for present needs by the Board of Trade in England. Electric energy equal to 3,600,000 joules. One Kilowatt-hour.

Unit of Electric Work.—The joule.

Unit of Electrostatic Capacity.—That capacity of a conductor or condenser which admits of its being charged with a quantity of electricity equal to one coulomb by an electro-motive force of one volt.

Unit of Force.—The fundamental or C. G. S. unit of force, which is the dyne. A force which can impart an acceleration of one centimetre-per-second to a mass of one gramme per second.

Unit of Heat.—The British unit of heat or the pound-degree Fahrenheit, which is the quantity of heat required to raise the temperature of a pound of water from 32 deg. to 33 deg. Fahr. The C. G. S. unit is the gramme-degree centigrade; another metric unit is the kilogramme centigrade; the latter being termed the calorie, and the former the

joule; the term joule being applied to a quantity of heat equivalent to the energy of a Watt-second or volt-coulomb; equal to .241 gramme-degree calorie.

Unit of Illumination.—The lux.

Unit of Magnetic Flux.—The quantity of flux which will pass through a magnetic circuit the reluctance of which is one oersted, under a magneto-motive force of one gilbert.

Unit of Magnetic Intensity.—The intensity of a field of 10^8 C. G. S. The gauss.

Unit of Magneto-Motive Force.—A force equal to 0.7958 ampere-hour. The gilbert. That magneto-motive force which is necessary to cause one unit of flux to pass through a circuit against a magnetic resistance of an oersted.

Unit of Output of Dynamo-Electric Machine.—The unit of electric force supplied by the current of a dynamo-electric machine. The kilowatt.

Unit of Photometric Intensity.—The intensity of light that a candle which consumes 2 grains of sperm wax per minute will produce; the candle being of specified composition and dimensions.

Unit of Resistance.—The original ohm, so termed previous to 1884. A resistance which requires unit difference of potential to cause the passage of unit current strength through it.

Unit Strength of Current.—The ampere in the practical system of units and ten amperes in the C. G. S. system of units. A strength of current which will exert a force of one dyne on a unit magnetic pole when the current is passed through a circuit one

centimetre in length arranged in an arc of a circle one centimetre in radius, the pole being placed in the center of the arc.

Units of Work.—The unit of energy or the erg, the correlative of which is work and which is opposite to and equal to the energy expended in its accomplishment.

Universal Ether.—The ether supposed to exist everywhere in space.

Unmarked End of Magnet.—A term by which the south-seeking pole of the magnet was once known.

Unmarked Pole of Magnet.—A magnet's south-seeking pole.

Unmarked Magnet Pole.—A name signifying a magnet's south pole.

Unvarying Current.—A current whose strength does not vary.

Uranium Rays.—Becquerel rays.

Useful Life of Incandescent Lamp.—The length of time during which an incandescent lamp performs efficient duty.

V.

Vacuum.—A space empty or void of all matter. A space from which all gas has been exhausted.

Vacuum Pump.—An air pump.

Vacuum-Tube Lighting.—Illumination artificially obtained by passing electric charges through vacuum tubes.

Vacuum Tubes.—Tubes of glass through which electric discharges are passed after the gases have been

partially removed, thereby obtaining luminous effects—Roentgen's, Crookes' and other high vacuum tubes.

Valency.—The relative power of replacing hydrogen or combining therewith, possessed by different elements.

Vapor.—Any substance in the gaseous or aeriform state the condition of which is ordinarily that of a liquid or solid.

Vapor Globe of Incandescent Lamp.—A glass globe by which the chamber of an incandescent lamp is surrounded, which enables the lamp to be used in places where it is exposed to water or to be used in an explosive atmosphere.

Vapor Pressure.—The pressure at which liquids vaporize.

Vaporization.—The act of vaporizing or the state of being converted into vapor. The artificial formation of vapor.

Variable Resistance.—A resistance whose value is capable of being varied or changed. Adjustable resistance.

Variation of Declination.—A variation, at any place, of the earth's magnetic declination.

Variometer.—An instrument employed to determine the relative values of the horizontal component of the earth's magnetic field in different places.

Varley's Photometer.—A style of photometer which determines the intensity of the light to be measured from the relative openings of two concentric circular diaphragms introduced into two discs which

revolve; the standard light and that which is to be measured, passing respectively through them.

Vector.—A quantity which has both magnitude and direction.

Vector Diagram.—A diagram which shows the relations of vector quantities.

Vector Equations.—Equations which connect vector quantities.

Vector Potential.—A potential which has both magnitude and direction.

Velocity.—Rate of motion. The relation of motion to time, measured by the number of units of space passed over by the moving body in a unit of time; usually the number of feet in a second.

Velocity of Discharge.—The velocity of an escaping gas or liquid from an opening in a specified time. The time consumed by a discharge in passing from a specified length of conductor.

Velocity Ratio.—A term applied to the ratios existing between the electrostatic and electro-magnetic units. The relation between the velocities of two reciprocal parts of a machine.

Ventilated Armature-Windings.—Armature windings so constructed as to be readily cooled by driving currents of air over them.

Ventilation of Armature of Dynamo or Motor.—Ventilation of the armature by means of air supplied through apertures in it and which is provided for in order to obviate too great a rise in temperature during the operation of the machine.

Vernier.—A short scale made to slide along the divisions of a graduated instrument for indicating

parts of divisions, as the limb of a sextant or the scale of a barometer.

Vernier Caliper.—A vernier provided with a vernier scale to insure greater exactness in observation.

Vernier Wire-Gauge.—A micrometer wire gauge.

Vibrating Contact.—A spring contact which automatically opens and closes a circuit by being connected with one part of the circuit in such manner as to enable it to vibrate towards and from another part of the circuit.

Vibration.—Quick motion to and fro. Oscillation as of a pendulum or musical cord.

Vibration Frequency.—The number of vibrations per second.

Virgin Iron.—Iron which has never been magnetized.

Viscous Hysteresis.—The creeping up by degrees of magnetization upon the application of a magnetic force with positive steadiness to a bar of iron, and which may equal several per cent of the total magnetization, and continue in effect for half hour or so. The true magnetic lag.

Vis-Viva.—The kinetic energy of a moving body. Mechanical energy.

Vitreous.—Pertaining to glass.

Volatilization Electric.—The superficial sublimation or evaporation of a substance under the influence of negative electricity.

Volt.—The practical unit of electro-motive force or difference of potential. An electro-motive force which would cause a current of one ampere to flow through a resistance of one ohm. The electro-motive force induced in a conductor by its cutting

100,000,000 lines of force per second. Such a rise of potential as would be produced by charging a condenser of one farad capacity with one coulomb. An electro-motive force equal to 10^8 absolute electro-magnetic units, or to the one-three-hundredth electrostatic unit.

Volt-Ammeter.—A term applied to an instrument which can measure either or both volts and amperes in a circuit.

Volt-Ampere.—The watt.

Voltage.—Potential difference or electro-motive force expressed in volts.

Voltaic Arc.—The brilliant arc between two carbon electrodes barely separated, caused by a current of adequate strength and involving adequate potential difference; the pencils of carbon forming terminals in the circuit; being first placed in contact and then slightly separated.

Voltaic Cell.—Two metals or a metal and a metalloid which when combined and immersed in electrolytes and connected by a conductor will generate electricity.

Voltaic Effect.—The potential difference developed by contact of unlike conducting metals.

Voltameter.—An apparatus employed to determine the quantity of electricity flowing through a conductor by measuring its electrolytic action.

Vulcabeston.—An insulating material composed of rubber and asbestos.

Vulcanite.—Vulcanized india rubber, valuable for its high insulating properties and specific inductive capability.

Vulcanized Fibre.—An insulating material used where the highest insulation is required.

Vulcanizing Wooden Poles.—Confining wooden poles in a tight cylinder and then subjecting them to the action of heat.

W.

Wall Bracket.—An insulator bracket fastened to the wall.

Wall Set.—Telephone apparatus set against a wall.

Wall Socket.—A socket for an incandescent lamp designed to be attached to a wall.

Wandering of Electric Spark.—A brilliant globule produced by a discharge, and which moves in a slow and irregular manner over the surface of the tin foil in a condenser to which the terminals of a rheostatic machine are placed, when a perforation accidentally happens to the mica plate in the condenser.

Waste Magnetic Field.—A stray field.

Watch-Case Telephone Receiver.—A small telephone receiver resembling a watch case.

Watchman's Electric Register.—A style of recorder which makes a permanent record of the visits of a watchman to the different portions of his beat at stated intervals.

Water-Cooled Transformer.—A transformer cooled by means of water being forced through or around it.

Water Horse-Power.—A horse power which falling water develops and equal to about 15 cubic feet of water falling through a distance of one foot per second.

Water-Level Alarm, Electric.—An electrically sounded alarm when a change of water level takes place in a tank or boiler.

Water-Pipe Resistance.—A resistance offered by any pipe to the water flowing through it.

Water-Proof Wire.—Wire encased in water-proof covering.

Water Pyrometer.—A pyrometer which determines the temperature of a furnace or other source of intense heat by exposing a metal cylinder of a specified weight to the source of heat for a specified time and then placing the cylinder into a known weight of water and noting the increase of temperature in the water.

Water Rheostat.—A rheostat the resistance of which is determined by means of a quantity of water of fixed dimensions.

Watt.—The practical unit of electric activity, rate of work or rate of energy. The power is equivalent to 44.25 foot-pounds of work done in a minute, or 0.7375 foot-pound of work done in a second.

Watt Arc.—A voltaic arc whose electric power is reckoned in watts.

Watt-Hour.—A unit of electric energy or work. One watt exerted or expended for one hour.

Wattmeter.—An instrument serving to measure the power of a circuit.

Wave Winding.—A winding which resembles a wave in form. Continuous or undulatory winding.

Weber.—The practical unit of magnetic flux. A name suggested by Clausius and Siemens to denote a

magnet pole of unit strength; but the use of the term has been abandoned.

Weber's Theory of Diamagnetism.—A theory which assumes originally magnetized atoms in order to account for diamagnetism.

Weight Efficiency of Transformer.—A transformer's specific activity.

Welding.—Uniting metals at a high temperature and leaving no trace of a junction.

Welding Converter.—A transformer used to step down an alternating current which is used for the purpose of fusing or welding metals together.

Welding, Electric.—Welding by the use of heat electrically generated.

Welding Transformer.—A step-down transformer used in electric welding.

Welsbach Burner.—A mantle covered with refractory material whose light is due to incandescence under the action of a Bunsen flame.

Western Union Splice.—An American wire joint.

Wheatstone's Electric Balance.—An electric bridge or balance.

Wheatstone's Bridge.—A Wheatstone's electric balance.

Whistling Effect.—In a carbon transmitter and telephone receiver in a line, an effect produced when the transmitter, being close to the receiver is slightly jarred, resulting in the emission of a musical sound by the receiver and which reacts upon the transmitter, producing similar sounds in other receivers on the same circuit.

White Heat.—That temperature of a heated body at which it glows with a white heat.

Wind, Electric.—A rush of air atoms from a point connected to a condenser statically charged.

Windings.—The coils put on the armature of a dynamo or motor or on an electro-magnet's core.

Wipe Spark.—A spark emitted from a spark coil produced by the wiping contact of a spring.

Wiped Joint.—A plumber's joint. A joint formed in the lead sheathing of a cable by applying free metal to the surfaces as done by plumbers.

Wiping Contact.—The contact made by one conductor wiping against another.

Wire Splice.—A splice made between two lengths of wire.

Wire Terminals.—Eyes of metal suitable to solder to the ends of wires for switchboard connections.

Wire-Wound Armature.—An armature whose windings consist of wire in distinction to one wound with bars.

Wireless Telegraphy.—A term meaning any system of telegraphic communication which can be carried on without circuits composed of wires.

Wiring.—Placing wires in a circuit. All of the electric conductors employed in an electric distribution circuit referred to collectively.

Work.—The action of a force through space against resistance.

Woven-Wire Dynamo or Motor Brushes.—Brushes made of gauze for dynamos or motors.

X.

X-Ray Lamp.—A high vacuum tube lamp whose interior walls are covered with crystals of calcium or other fluorescent substances and which when exposed to X-Rays gives out light.

X-Ray Photograph.—A term signifying radiograph.

X-Ray Transformer.—A transformer serving to obtain the high potential discharges used in X-ray tubes.

X-Rays.—A curious kind of radiation discovered by and named after Roentgen, the exact nature of which is not yet known. Rays which readily penetrate and pass through divers substances; causing fluorescence in certain bodies and producing on photographic plates an actinic effect; causing the discharge of an insulated charged conductor, and producing a troublesome affection of the skin when exposed to the rays too long.

Y.

Y-Connection of Three-Phaser.—Star connection. The connection of a triphaser's three circuits to the same junction, and resembling the letter Y in appearance.

Y-Connected Three-Phaser Armature.—A triphase armature with three circuits connected in common to one point.

Y-Current.—A current in a triphase system between any wire and the neutral point.

Y-Potential of Triphase System.—In a triphase system, the effective difference of potential or voltmeter

pressure between one terminal or conductor and the neutral point.

Yoke.—The piece of iron in an electro-magnet which connects the ends most remote from the poles of the two parts of the core where the wire has been wound.

Z.

Zinc-Battery.—A battery which decomposes zinc in an electrolyte, thereby producing a current.

Zinc-Carbon Voltaic Cell.—A voltaic cell consisting of a suitable electrolyte into which is immersed a zinc-carbon couple.

Zinc Currents.—Negative currents.

Zinc-Lead Accumulator.—A secondary cell in which are used lead and zinc plates.

Zinc Plating.—The employment of zinc in electro-plating.

PART II

**ELECTRICIANS' EXAMINATION
QUESTIONS AND ANSWERS**

Electricians'

Questions and Answers

Q. How can a wattmeter that is running backward be corrected?

A. By reversing the connections so that it is fed from the other side. Simply reversing polarity will not affect it.

Q. In locating trouble on bell work what would be your first step?

A. Examine battery.

Q. How is a shunt motor reversed?

A. It can be made to run in the opposite direction by reversing either the field or armature connections. If both are reversed it will continue to run in the same direction.

Q. How do you test to determine which is the neutral wire of a three wire system?

A. Connect two lamps which together require the full voltage of the outside wires in series and try to burn them with the voltage between two of the wires. That wire in connection with which the lamps can be made to burn at half candle power only when con-

nected to either of the other wires is the neutral.

Q. In what manner can the positive pole of an arc lamp be determined?

A. The top carbon is usually made the positive and the lamp must be so connected that this carbon becomes the hotter of the two. If the lamp is connected wrong strong shadows will be thrown upward.

Q. What is a synchroscope?

A. A synchroscope is an instrument used for synchronizing alternating current generators which are to be operated in parallel. For diagrams and descriptions see Volume 6, page 139.

Q. Can a polyphase motor operate on one phase?

A. Such motors cannot be started unless all of the phases are in working order, but if it is in motion it will continue to run on one phase. The remaining phase will, however, draw so much current that either its fuse or the motor itself will soon burn out.

Q. What is the usual effect produced by the use of large carbons in arc lamps?

A. The arc is likely to travel around the outer edge and thus cause very unsatisfactory illumination.

Q. Why should the brushes on a commutator be "staggered?"

A. To avoid as far as possible wearing grooves into the commutator.

Q. What is meant by "power factor?"

A. The term power factor is used only in connection with alternating currents. It is always expressed

in per centages of 1 and can never exceed unity. The nearer unity the power factor of a circuit or motor can be made the better it is.

Q. What is the advantage of a circuit breaker over a fuse?

A. If properly taken care of a circuit breaker is much more reliable than a fuse and in case of a blow out the circuit can be much quicker restored.

Q. How would you install a large fuse in a live circuit?

A. Install a fuse in one side of the cutout and then connect a jumper across the other side. If the lights now burn properly the second fuse may be installed while current is passing through the jumper.

Q. Explain how you would determine direction of flow of current in a wire.

A. If the wire is carrying sufficient current a compass needle may be held under or above the wire. The needle will always tend to align itself at right angles to the wire. If the current is flowing away from you the north seeking end of the needle will be deflected toward the left while it is below the wire, and to the right if above.

Q. What effect will high resistance in a motor line have upon the performance of the motor?

A. The speed will be much reduced with an increased load. More current will be required to carry a given load and there will be undue heating of the armature.

Q. How would you test a compound motor to see if it is connected properly?

A. A compound motor may be either cumulative or differential. Remove belt from pulley so that armature will have no load and disconnect shunt field. If the motor runs with the series field only in the same direction as it did with the shunt field it is connected cumulative; if in the opposite direction, it is connected differential.

Q. What is meant by the counter E.M.F. of a motor?

A. The counter E.M.F. of a motor is back pressure produced by the motor armature. A motor is practically identical with a dynamo and of course generates an E.M.F. just as the dynamo does. The counter E.M.F. is always opposed to the E.M.F. of the circuit which is supplying the motor. The counter E.M.F. of the motor multiplied by the current is the measure of the power developed by the motor.

The counter E.M.F. of a motor is always equal to the E.M.F. at its terminals minus the product of the current and resistance of the armature. Thus a motor on a 110 volt system drawing 10 amperes and having an armature resistance of 2 ohms would show a counter E.M.F. of 90 volts and develop 900 watts.

Q. What is the difference between a three phase three wire line and the ordinary three wire system.

A. The two are often confounded and three phase circuits are sometimes wrongly connected up in the

same way as ordinary three wire circuits. In volume 6 on page 164 are given cutout connections for three wire circuits and on page 166 are diagrams showing how three phase branch circuit should be connected.

Q. What is a booster?

A. A booster is used to raise the voltage on certain lines without at the same time affecting the voltage on other lines connected to the same system. In connection with direct current systems it is a motor generator connected so as to add its own voltage to that of the line with which it is connected. For alternating currents it is a transformer used in the same way. See page 178 of volume 6.

Q. What is meant by synchronizing?

A. Synchronizing is a term used in connection with the operation of alternating current dynamos in parallel. It describes the process of bringing such machines in step with each other so that they must run at exactly the same speed and maintain the same phase relations.

Q. What would happen if the voltage of a dynamo feeding storage battery should fall below the voltage of the battery?

A. The battery would discharge through the generator.

Q. Why are alternating current dynamos always multipolar?

A. They are made multipolar to obtain the high voltages which are used in long distance transmis-

sion. All the E.M.F.s produced by the various pairs of poles are in series and thus add up.

Q. How would you increase the speed of a shunt motor?

A. It would be necessary either to rewind the armature, giving it a lesser number of turns of wire or to weaken the field.

Q. What is meant by "star" connection of transformers?

A. There are two methods by which three phase transformers can be connected. The star connection is made by connecting the three line wires each to one of the transformer leads and connecting the other three transformer wires together.

Q. What is meant by the delta connection?

A. The delta connection is made by connecting the three transformers together so as to form a closed triangle. The three line wires are then connected to the three points where the different transformer leads meet.

Q. How can you increase the voltage of a dynamo?

A. By increasing the speed of the armature or the current through the fields.

Q. Why is it necessary to be so careful not to allow the bearings of induction motors to wear?

A. The armature or rotor of an induction motor is usually made to fit very snugly into the space between the fields or stator. A very small amount of wear

will therefore allow it to come in contact with one side of the stator and tear itself to pieces.

Q. Why is it economical to throw away an incandescent lamp when its light giving powers have fallen off a certain per cent?

A. Because if one is satisfied with the reduced amount of light one had better put in a lamp of smaller candle power. As an example, a 55 watt lamp at 6 cents per K.W. will cost to operate one-third cent per hour. An 8 candle power lamp will cost only about half as much and will therefore save one-sixth cent per hour in cost of operation which in 100 hours' time will save the cost of the lamp.

It is therefore very foolish to continue a lamp in use after its candle power has been materially reduced even though one is still able to get along with the light.

Q. What effect will a heavy short circuit have upon a shunt dynamo?

A. It will cause a momentary increase in current but will at the same time lower the E.M.F. at the field terminals, so that the field strength will be lost and if the resistance of the short is low enough all current will flow through it leaving the fields without current and the E.M.F. will therefore die down.

Q. How will an open circuit in an armature manifest itself?

A. By severe sparking at the commutator.

Q. How will a short circuited coil act?

A. A short circuited coil will soon burn out but will generally give evidence of trouble through an odor of burning shellac or varnish.

Q. What effect does "frosting" have upon an incandescent lamp?

A. It reduces the candle power of the lamp from 15 to 20 per cent and also shortens the life of the lamp considerable.

Q. What are the conditions that make a flaming arc desirable?

A. The flaming arc is very economical but cannot be used unless there is room for hanging it very high. The light is too penetrating to be brought in the range of vision.

Q. Explain the starting of an induction motor.

A. The ordinary induction motor has a squirrel cage armature and is controlled by the use of auto starters or throw over switch. The very small motors have only an ordinary switch and are started by simply closing the switch.

Larger sizes are equipped with double throw switches. The switch is so arranged that thrown one way the motor feeds direct from the line without fuse protection; this is known as the starting side of the switch and the switch is held to this position until the motor has attained nearly its full speed when the switch is thrown to the other side so that the current must now pass through the fuses. Some operators indulge in the foolish practice of closing switches for

a moment then opening again and immediately closing and repeating this a number of times, thus trying to start the motor by gradual steps. This practice, however, produces the opposite effect that is intended; instead of lessening the rush of current it produces a number of rushes and results in speedy destruction of switches.

Q. What would happen if a single wire carrying alternating current were run in an iron pipe?

A. The pipe would soon become very hot and the voltage of the wire would be much reduced.

Q. Which kind of incandescent lamp is not suitable for use with alternating current?

A. The tantalum lamp.

Q. Why can a ring from a magneto be obtained from a lead covered cable although there is no electrical connection whatever between the lead and the wire?

A. Because the cable possesses capacity. Enough current rushes into the cable to affect the bell.

Q. Why should the secondaries of transformers be grounded?

A. It is always possible that the insulation between the primary and secondary winding of the transformer should break down. When this occurs the full voltage of the primary system (which is often very high) would come in contact with all of the devices in the building and greatly endanger life. If the secondaries are properly grounded this current

will have a low resistance path to ground and there will be no chance of its passing to ground through the body of any one touching the wires or devices connected with it.

Q. Why is the blowing of an alternating current fuse accompanied by less damage than that of a direct current?

A. The tendency of an alternating current to maintain an arc is much less than that of a direct current. The alternating current passes through zero from 50 to 200 times per second and the arc is very likely to be disrupted at the zero point.

Q. Why does the product of the volts and amperes as measured by instruments require to be multiplied by the power factor of the circuit to obtain the true power?

A. If we connect an ammeter and voltmeter into an alternating current circuit each instrument has of course its own permanent field just about as direct current instruments have. Each instrument will therefore measure the volts and amperes actually existing. In a wattmeter the case is different, the pressure coil (which represents the voltmeter) depends upon its field for the current in the series coil (which represents the ammeter) and it is only that part of the two currents which exist at the same time that affect the wattmeter.

In an alternating current circuit which is supplying an inductive load the current always lags somewhat

behind the voltage so that the maxima of current and voltage never occur at the same time and for this reason the indications obtained from a wattmeter will always be found less than the product of the volts and amperes.

Q. How is the power factor of a circuit determined?

A. The power factor of a circuit is found by dividing the true watts as indicated by a wattmeter by the apparent watts or the product of the volts and amperes. As stated above it is nearly always less than unity and can never be more.

Q. Is there any other way of determining the power factor of a circuit than by the process above outlined?

A. There are instruments for this purpose which are known as power factor meters. A full description of such instruments is given in Volume 6.

Q. What is meant by capacity?

A. Certain arrangements of electrical conductors have electrical capacity, that is, have the capacity to receive a considerable charge of electricity, much as a jar has capacity to receive a charge of water. The quantity of electricity flowing into and out of such conductors can be measured. An arrangement of conductors in such a manner as to possess an appreciable capacity is known as a condenser. A short length of lead covered cable will be found to have capacity enough to admit of ringing a magneto by the current

which flows when one wire is connected to the lead and the other to the copper wire. A small installation of conduit will also be found to have sufficient capacity to give a click in the telephone and battery if one terminal be connected to the conduit and the other to the wire in it.

Q. What effect does capacity have upon a circuit?

A. Capacity can be used to offset the effect of inductance. If a circuit possesses large capacity the current will precede the voltage and there will be a leading current instead of a lagging current.

Q. What is reactance?

A. Reactance is a resistance peculiar to alternating current circuits. It is measured in ohms and is equivalent to ohmic resistance but as the name implies of a different nature. It does not consume energy. It is numerically equal in ohms to the resistance through which the inductive E.M.F. would send the current. It exists only while the current is changing in value and is proportional to the rate of change.

Q. A three phase switch board is equipped with three ammeters, all showing very nearly the same reading: What is the power being delivered?

A. No attention need be paid to the three readings so far as determining the power is concerned. Three ammeters are provided only to show whether the phases are balanced. To obtain the power in the circuit multiply the reading of one ammeter by 1.73 and this in turn by the voltage and power factor.

Q. What is electric resonance?

A. The inductance of a circuit increases with an increase in the frequency; it depends upon the rate of change of current strength and the greater the rate of change the greater it becomes. The reverse is true of a capacity; time is required to charge a condenser and the higher the frequency, other things being equal, the lower will be the capacity of that circuit. Bearing these two facts in mind it can readily be seen that for any circuit containing inductance and capacity there must be a critical frequency at which these two are exactly equal. When this condition exists troublesome surgings of current occur, and such a circuit is said to have electrical resonance.

Q. What is meant by the E.M.F. of self induction?

A. It is a counter E.M.F. induced by an alternating current in the very coils of wire in which the current flows. It is especially noticeable when an alternating current circulates around an iron core. The lines of force produced by the current flowing, cut the wires of the circuit and thus produce an E.M.F. which acts in opposition to the impressed E.M.F.

Q. How does the loss in voltage in an alternating circuit compare with that in a direct current circuit?

A. In a direct current circuit the loss of potential represents a loss of energy. The loss is due entirely to the resistance, and the current and is equal to the product of the two.

In an alternating current circuit there is the same

loss as above and in addition to this there is what is termed the inductive drop. This is due to the counter E.M.F. of self induction and represents no loss of energy. In this respect it is similar to the counter E.M.F. produced by a motor.

Q. What is impedance?

A. Impedance is to an alternating voltage what resistance is to a direct, namely the factor by which the voltage must be divided to obtain the value of the current. It is made up of the ohmic resistance and the reactance of the circuit.

Q. What is meant by "wattless" current?

A. If the current in an alternating current circuit is not in step with the E.M.F. it passes through the windings of the armature at a time when not all of the wires are under the influence of the pole piece which generates the voltage producing it. The current lagging behind the voltage helps to run the dynamo as a motor, that is, it returns part of the energy which was required to produce it to the dynamo and thus does no work and is therefore spoken of as "wattless."

The current flowing into and out of a condenser or a line having capacity may also be spoken of as wattless.

Q. Does the intensity of an electric light always vary as the square of the distance from the source?

A. This law applies fairly well to a single light but must not be applied at all unless the distance is great enough so that the light may be considered as a

point. It would not hold within six inches or a foot. It must not be applied either to a row of lights. In such a case or in connection with the line-o-lite the intensity varies more approximately directly as the distance. That is, if a line-o-lite be raised four feet above a given plane it will have one-half the intensity as at two feet, while the intensity of a single light would be but one-fourth. This is due to the fact that the rays of light emanating from different points or from different lights in a row overlap in one direction and thus, what one lamp loses by spreading over a larger surface it gains by those at either side spreading beneath it.

Q. Which one of all the illuminants is best for color matching?

A. The Moore tube.

Q. Wherein does this differ from other methods of illumination?

A. This is practically a Geissler tube. It requires long tubes of glass to be erected over the spaces to be illuminated and also requires special transformers, sometimes of very high voltage.

Q. How is the candle power of lights of different color compared?

A. Lights of different color cannot be compared by an ordinary photometer. For this purpose a luminometer is used. This is a simple device arranged so as to contain a chart carrying printed letters (large and small) that do not make words. To compare illumina-

tion the instrument is held at such distance from the light that the large letters can still be discerned while the small become too indistinct. This method of arranging the letters makes it possible to judge quite closely as to the degree of illumination falling upon the chart. The candle power of the different sources of light is then determined according to the square of the distance as with a photometer.

Q. For which type of arc lamp is the mercury rectifier most used?

A. For the magnetite and other metallic arc lamps.

Q. What is the purpose of a fuse?

A. A fuse is placed in a circuit to protect the wire and apparatus from excessive current. It does this by melting and opening the circuit.

Q. What special precaution must be taken in handling series arc circuits?

A. Never stand on the ground or on any grounded material while handling any part of such a circuit and care should be taken not to cut oneself into the circuit.

Q. What is the difference between a switch used in a series arc circuit and one used on a multiple circuit?

A. The former switch must be arranged to close one part of the circuit before cutting off the remainder; the latter switch opens both wires.

Q. How is the insulation resistance of an installation determined by the use of a voltmeter?

A. The voltmeter should first be connected across

the outside wires and the voltage of the system obtained. Readings are then taken between each wire and the ground. By the use of the proper formula the insulation resistance may be obtained.

Q. On what kind of work must indicating switches be used?

A. On motor circuits and on circuits for electric heaters.

Q. What factor must be considered in determining the proper size of wire to use for a motor circuit?

A. An overload capacity of at least 25% must be provided.

Q. What is an electrical horsepower and how is it obtained?

A. The electrical horsepower is equal to 746 watts and is obtained by multiplying the current and voltage and dividing by 746.

Q. How should wires be run in "fish" work?

A. Encased in flexible tubing, each wire to have its own tube.

Q. What is the proper location of a service switch and fuses and why?

A. Immediately at the point where the wires enter the building. As the wires coming from pole to building in overhead construction are often protected by the transformer primary fuses only, a very heavy current would result in case of a short circuit or ground on the service wires. This current must not be allowed to enter the building.

Q. How many 16 candle-power lamps may be placed on one circuit?

A. Twelve.

Q. What is a convertible system of wiring?

A. A system which may be operated as either a two- or three-wire system.

Q. What is the "tree" system of wiring?

A. A method of wiring in which the mains are reduced in size as part of the load is taken off. This system is often used in buildings where the size of mains is changed after the load is taken off at each floor.

Q. What special precautions should be taken in locating fuses in the above system of wiring?

A. The fuses should be located in the mains after the load for that floor is taken off.

Q. How do you determine the circular millage of a wire?

A. By squaring the diameter (in mils) of the wire.

Q. What is the proper method of mounting a starting box?

A. On a slate or marble panel slightly larger than the starting box and fastened to the wall by screws independent of those holding the box.

Q. What is an equalizer connection?

A. A connection used in the parallel operation of compound-wound generators to equalize the loads on the several machines. The connection is made be-

tween the armature terminals from which the series fields are taken.

Q. What is a single stroke bell and for what purpose is it used?

A. A bell in which the circuit is not automatically broken when the circuit to the bell is closed. It is used where it is desired to signal by means of certain numbers of strokes and is also often used in connection with another bell so that it may be known that the other bell, which may be located some distance away, is ringing. In this case the single stroke bell is operated by the remaining bell.

Q. How could you convey more power on a wire without increasing the loss or heating?

A. By increasing the voltage.

Q. How is the amount of current (or amperes) affected by the resistance and voltage?

A. The current is directly proportional to the voltage and inversely proportional to the resistance.

Q. What is meant by conductivity?

A. The property of a wire for conducting a current of electricity. It is the reciprocal of the resistance.

Q. What are the four electrical units most commonly used?

A. Ampere, unit of current; volt unit of electromotive force; ohm, unit of resistance; watt, unit of power.

Q. What is Ohm's law?

E

A. $I = \frac{E}{R}$. The current is equal to the electromotive force divided by the resistance.

Q. Name four materials commonly used for insulators.

A. Marble, slate, porcelain, mica.

Q. How are dynamos protected from overloads?

A. By fuses or circuit breakers in their lead wires.

Q. Why are electric lighting fixtures generally insulated from the ground and how?

A. To reduce the electrical strain on the brass shell sockets and on the thinly covered fixture wire. Insulating joints are placed in the main fixture stem and canopy insulators on the canopy.

Q. Describe a three-wire system.

A. A three-wire system is a system of distribution, the three wires being connected to two dynamos connected in series, one wire being carried from each of the outside terminals and the remaining or neutral wire being connected to the common junction of the two machines. The voltage between the two outside wires is twice that between either of these wires and the neutral wire.

Q. What is the loop system of wiring and what are its advantages?

A. In the loop system of wiring, wires are run continuous from one outlet to the other and no taps are taken off the wire at any point. This system is used

where wires are run on concealed knobs and tubes or in flexible tubing and has the advantage that there are no concealed joints. The testing of wires is made much easier.

Q. What kind of wire must be used in concealed knob and tube work?

A. Rubber covered wire.

Q. What is "drop" in an electrical circuit and on what does it depend?

A. The loss of potential or electromotive force due to the ohmic resistance of a conductor. It is directly proportional to the resistance, and to the electromotive force.

Q. What determines the safe carrying capacity of a wire?

A. The rise in temperature due to a current of electricity flowing through it.

Q. Why should wires be covered by separate flexible tubings where such tubings are allowed?

A. Flexible tubing is not fire proof so that if two wires were carried in the same tubing a short circuit might ignite the tubing. Wires of opposite polarity are separated by two thicknesses of flexible tube.

Q. Explain the purpose and construction of a starting box. How does it differ from a speed controller?

A. A starting box is used in connection with D. C. motors to limit the current in starting, the ohmic resistance of the ordinary motor armature being so

low that an enormous amount of current would flow but for the starting box. As the motor comes up to speed the counter electromotive force checks the current. A starting box consists of a number of resistance units provided with terminals so that the resistance may be gradually cut out. A speed controller differs from a starting box in being wound with a wire of greater carrying capacity than that used in a starting box.

Q. What devices are required where service enters a building?

A. A cutout and a switch.

Q. What is the difference between a conductor and an insulator?

A. The difference is only a relative one. All materials are conductors but some are of such high resistance as to allow only a negligible amount of current flow through them. Those which are of such high resistance are called insulators.

Q. What is the ratio between the amount of copper required in a two-wire system and in a three-wire system for equal loads and equal losses?

A. Three-eighths; in favor of the three-wire system.

Q. In fastening wood moulding with toggle bolts what precautions should be taken?

A. The nuts should be placed on the outside of the capping. Never cut out the ridge between the grooves.

Q. Why are the frames of motors and generators insulated from the ground?

A. To reduce the strain on the insulation. The tendency of the current to jump to the metal parts of the machine is reduced.

Q. Where are twin wires allowed?

A. In conduit, and for flexible connections.

Q. How must wires be run in elevator shafts?

A. In conduit or armored cable.

Q. What is the difference between a series connection and a multiple connection and for what purpose are each used?

A. In a series connection the positive terminal of the device or apparatus is connected to the negative terminal of the next device or apparatus and this method is followed throughout. In a multiple system the positive terminals of all the devices are connected to the same wire and the negative terminals to the remaining wire. The series system is used mostly for series arc circuits, and the multiple system for incandescent and motor circuits, and for multiple arc lamps.

Q. What is meant by a low potential system?

A. A system in which the voltage is less than 550 volts and more than 10 volts.

Q. Why do alternating current motors take more current in starting than direct current motors?

A. An alternating current motor with the armature at rest is simply a transformer with the secondary cir-

circuit short circuited. A considerable amount of current is therefore taken at starting.

Q. What is hard drawn copper wire and what are its characteristics?

A. Copper wire which is not annealed during the drawing. It has considerable tensile strength and is very stiff and difficult to work with.

Q. How far apart should wires be run for cleat work?

A. Two and one-half inches.

Q. Why are large wires stranded?

A. For greater convenience in handling

Q. What is the smallest wire allowed?

A. No. 18 B. & S. gage for fixture work and for flexible cord.

Q. How should gas piping be fastened in an outlet box and why?

A. A permanent and good connection should be made between the gas piping and the outlet box so that at this point arcing may not be produced which might burn a hole in the gas pipe and ignite the escaping gas.

Q. Why is copper tinned?

A. To prevent the sulphur used in the rubber insulating compound from corroding the wire.

Q. What kind of sockets would you use in wiring a wet place?

A. Weatherproof sockets.

Q. How should a cord be fastened in a socket?

A. By means of a knot arranged in the cord to come under the cap of the socket to take all strain off the binding posts.

Q. How should conduit be treated when being installed?

A. Each end of every pipe should be reamed out with a pipe reamer before being put in place, and the end of the pipe made flat and square.

Q. How would you do away with static electricity?

A. By placing a metallic comb above the belt and grounding the comb or by grounding the frame of the motor or dynamo through a high resistance.

Q. What is the difference between the winding of a voltmeter and an ammeter?

A. A voltmeter is wound with fine wire and has a very high resistance and an ammeter is wound with a very large wire of low resistance.

Q. Why should a conduit system be grounded and how?

A. So that the conduit may never become charged with a potential above that of the earth. By connecting it electrically with guarded metal work or pipes.

Q. How should an ammeter be placed in a circuit? How should a voltmeter be placed in a circuit?

A. An ammeter is connected in series with the circuit and a voltmeter in multiple.

Q. What is the greatest difference of potential you would allow on wires in a fixture?

A. Three hundred volts

Q. Why is more current allowed on wires run open than on wires run concealed?

A. Where wires are run open they are exposed to the free circulation of the air and can therefore carry a greater amount of current as the heat is rapidly dissipated and the temperature kept down.

Q. How should sockets be installed in gas houses?

A. They should be hung on pipe hangers and vapor proof sockets should be used.

Q. What is an auto-starter?

A. A device which serves the same purpose in starting an alternating current motor as a starting box does with a direct current motor, i. e. regulates the starting current. It does this by reducing the starting voltage.

Q. What is the difference in voltage relation between the three-wire system and a three-phase system.

A. In a three-wire system the voltage between the neutral wire and either of the outside wires is the same and only half of that between the outside wires. In a three-phase system the voltage between all wires is the same.

Q. How should the cutout be placed relative to the switch at the service entrance?

A. The cutout should be placed ahead of the switch so that it will protect it in case of a short circuit on the switch.

Q. What is largest fuse that may be used in a branch lighting circuit on a 110 volt system?

A. Six ampere.

Q. May moulding be concealed?

A. No.

Q. How should an auto-starter be installed?

A. With the same precautions as a starting box.

Q. What is the object of a conduit system?

A. To afford mechanical protection for the wires, to entirely enclose the wires in a fire proof enclosure, to afford an easy means of extracting or inserting wires.

Q. Name the usual instruments on a direct current switchboard.

A. Fuse or circuit breaker, switch, voltmeter, ammeter and ground detector.

Q. What is the difference between series-multiple and multiple-series?

A. The first word determines the system. For instance, a series multiple system is a series system with a number of groups of apparatus connected in series. A multiple-series system is a multiple system with a number of groups of apparatus connected in series.

Q. How should a knife switch be placed?

A. With the hinges at the bottom so that gravity will tend to open it.

Q. What special requirement is there concerning junction boxes in a conduit system and why?

A. Junction boxes should always be accessible.

This is necessary for the future installation and extraction of wires. It is impossible to run a fish wire through a junction box.

Q. What special precautions are necessary in a conduit job?

A. Care must be taken to see that the conduit system affords a complete electrical circuit throughout its entire length so that if any part of it should become alive the fuse will immediately blow, due to the short circuit formed by the conduit system and the ground wire.





**PLEASE DO NOT REMOVE
CARDS OR SLIPS FROM THIS POCKET**

UNIVERSITY OF TORONTO LIBRARY

TK

7

E44

1912

v. 7

Engin.

